YAMAHA 2012

SERVICE MANUAL

TT-R50E(B)

TT-R50

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EAS20060

TT-R50E(B)
SERVICE MANUAL

First edition, July 2011

EAS20071

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.

This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.

Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

EAS20081

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following notations.

⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**

⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**

NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**

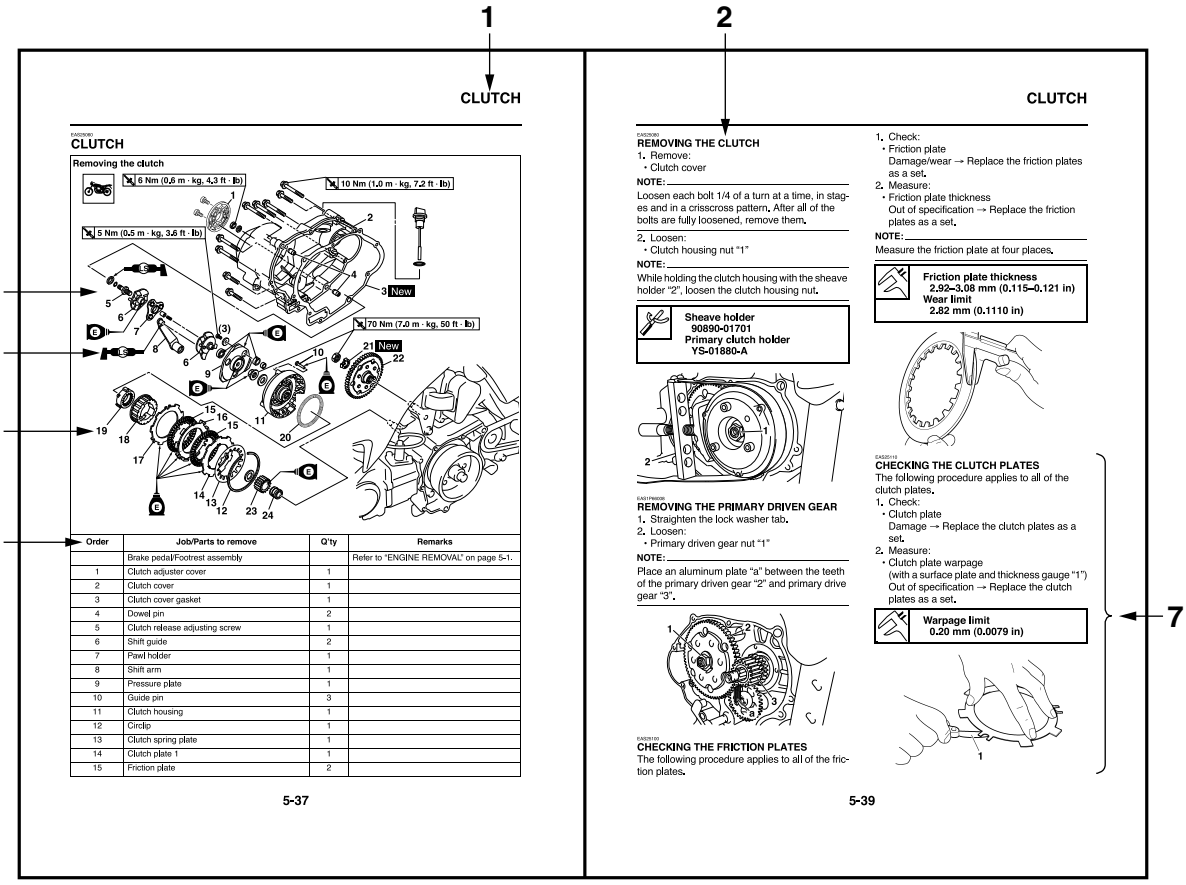
TIP	A TIP provides key information to make procedures easier or clearer.

EAS20091

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- The manual is divided into chapters and each chapter is divided into sections. The current section title "1" is shown at the top of each page.
- Sub-section titles "2" appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams "3" at the start of each removal and disassembly section.
- Numbers "4" are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols "5" indicate parts to be lubricated or replaced.
  Refer to "SYMBOLS".
- A job instruction chart "6" accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- Jobs "7" requiring more information (such as special tools and technical data) are described sequentially.



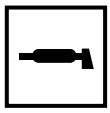
EAS20101

SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.

SYMBOL	DEFINITION	SYMBOL	DEFINITION
	Serviceable with engine mounted		Gear oil
	Filling fluid		Molybdenum disulfide oil
	Lubricant		Brake fluid
	Special tool		Wheel bearing grease
	Tightening torque		Lithium-soap-based grease
	Wear limit, clearance		Molybdenum disulfide grease
	Engine speed		Silicone grease
	Electrical data		Apply locking agent (LOCTITE®).
	Engine oil		Replace the part with a new one.

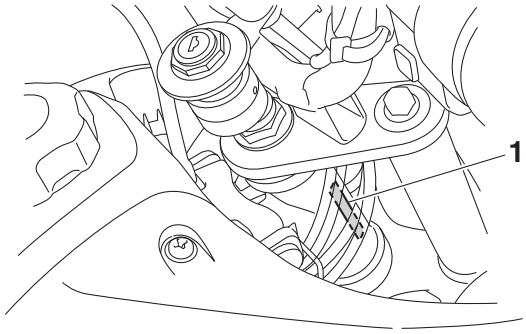
EAS20110

TABLE OF CONTENTS

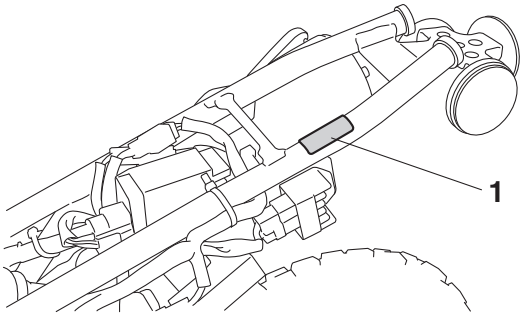
GENERAL INFORMATION

EAS20130
IDENTIFICATION

EAS20140
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS20150
MODEL LABEL
The model label “1” is affixed to the frame. This information will be needed to order spare parts.



EAS20180
IMPORTANT INFORMATION

EAS20190
PREPARATION FOR REMOVAL AND DISASSEMBLY

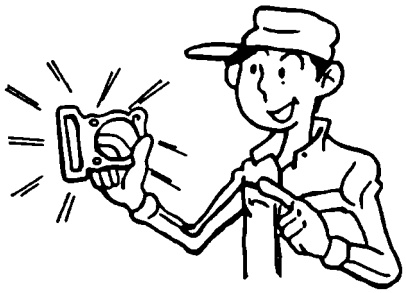
1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.

2. Use only the proper tools and cleaning equipment.
   Refer to "SPECIAL TOOLS" on page 1-9.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been "mated" through normal wear. Mated parts must always be reused or replaced as an assembly.

4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

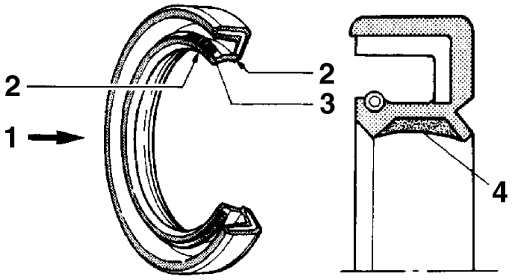
EAS20200
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS20210
GASKETS, OIL SEALS AND O-RINGS

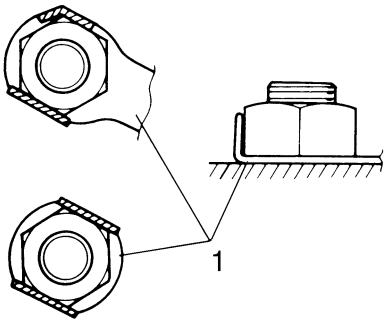
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



1. Oil
2. Lip
3. Spring
4. Grease

EAS20220
LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates "1" and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



EAS20231
BEARINGS AND OIL SEALS

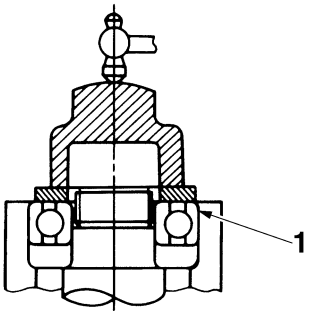
Install bearings "1" and oil seals "2" so that the manufacturer marks or numbers are visible.

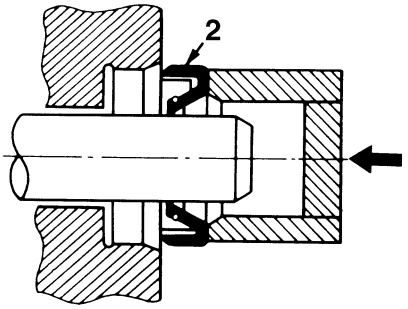
When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300

NOTICE

Do not spin the bearing with compressed air because this will damage the bearing surfaces.

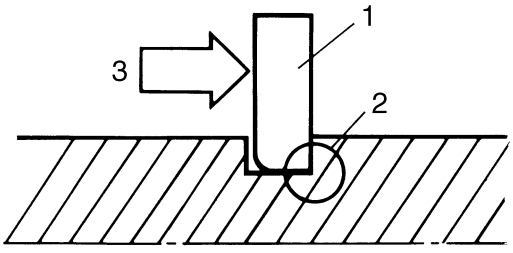




EAS20240

CIRCLIPS

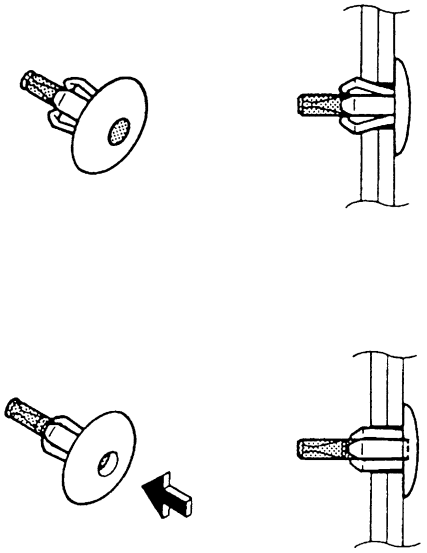
Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip "1", make sure the sharp-edged corner "2" is positioned opposite the thrust "3" that the circlip receives.



EAS30380
BASIC SERVICE INFORMATION

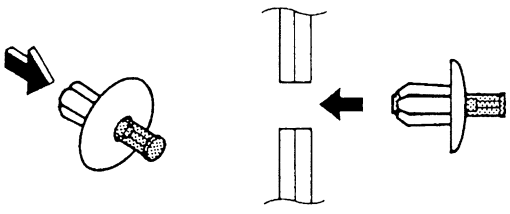
EAS30390
QUICK FASTENERS
Rivet type
1. Remove:
   • Quick fastener

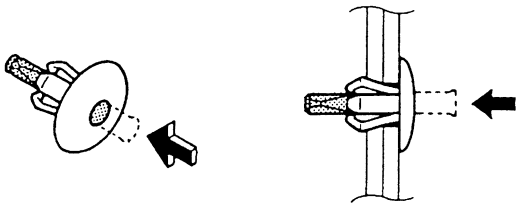
TIP
To remove the quick fastener, push its pin with a screwdriver, then pull the fastener out.



2. Install:
   • Quick fastener

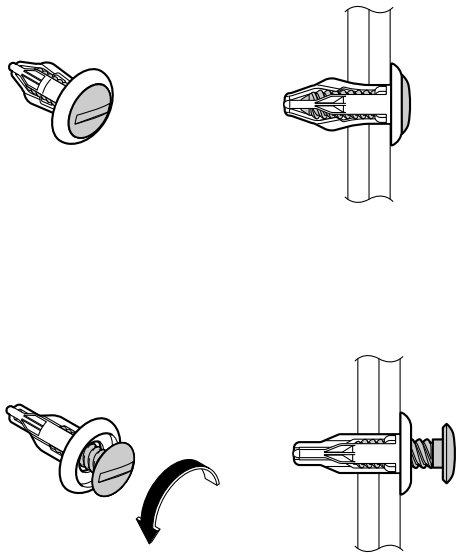
TIP
To install the quick fastener, push its pin so that it protrudes from the fastener head, then insert the fastener into the part to be secured and push the pin in with a screwdriver. Make sure that the pin is flush with the fastener's head.





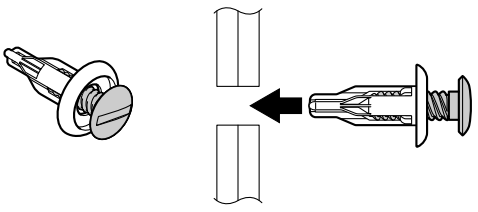
Screw type
1. Remove:
   • Quick fastener

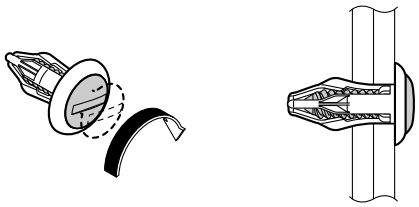
TIP
To remove the quick fastener, loosen the screw with a screwdriver, then pull the fastener out.



2. Install:
   • Quick fastener

TIP
To install the quick fastener, insert the fastener into the part to be secured and tighten the screw.

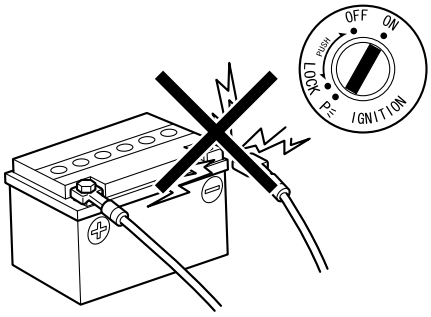




EAS30402
ELECTRICAL SYSTEM
Electrical parts handling

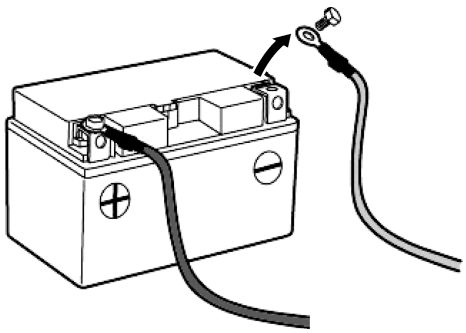
ECA16600
NOTICE

Never disconnect a battery lead while the engine is running; otherwise, the electrical components could be damaged.



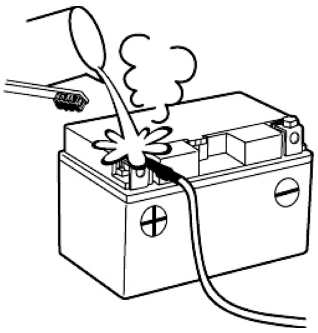
ECA16751
NOTICE

When disconnecting the battery leads from the battery, be sure to disconnect the negative battery lead first, then the positive battery lead. If the positive battery lead is disconnected first and a tool or similar item contacts the vehicle, a spark could be generated, which is extremely dangerous.



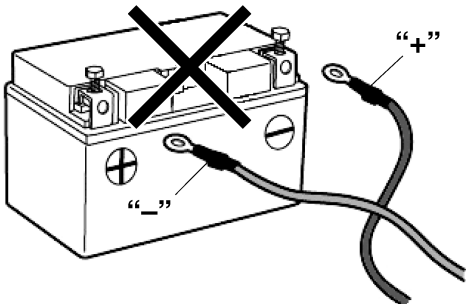
TIP

If a battery lead is difficult to disconnect due to rust on the battery terminal, remove the rust using hot water.



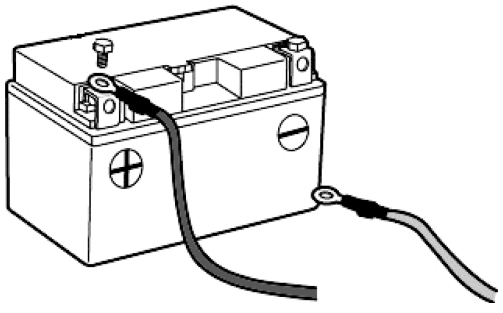
ECA16760
NOTICE

Be sure to connect the battery leads to the correct battery terminals. Reversing the battery lead connections could damage the electrical components.



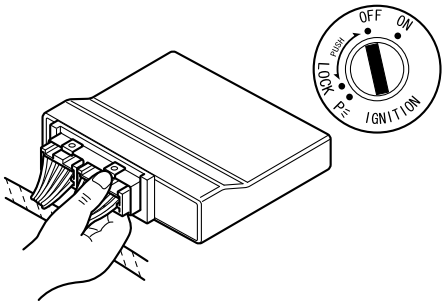
ECA16771
NOTICE

When connecting the battery leads to the battery, be sure to connect the positive battery lead first, then the negative battery lead. If the negative battery lead is connected first and a tool or similar item contacts the vehicle while the positive battery lead is being connected, a spark could be generated, which is extremely dangerous.



ECA16610
NOTICE

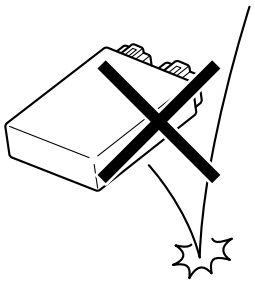
Turn the main switch to "OFF" before disconnecting or connecting an electrical component.



ECA16620

NOTICE

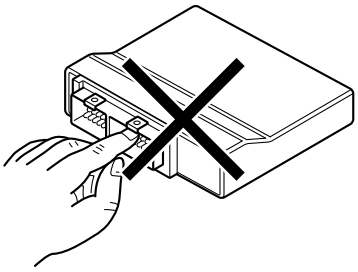
Handle electrical components with special care, and do not subject them to strong shocks.



ECA16630

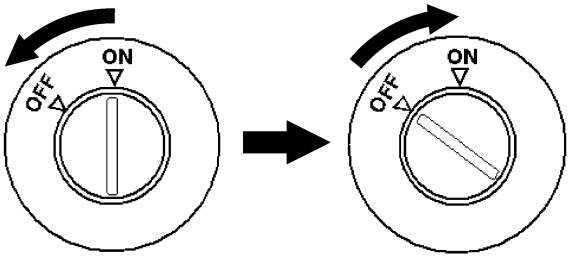
NOTICE

Electrical components are very sensitive to and can be damaged by static electricity. Therefore, never touch the terminals and be sure to keep the contacts clean.



TIP

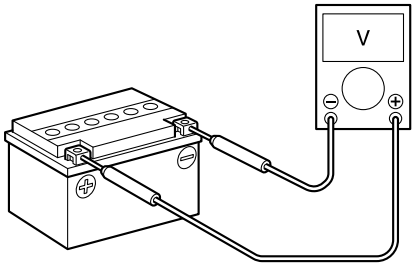
When resetting the ECU by turning the main switch to "OFF", be sure to wait approximately 5 seconds before turning the main switch back to "ON".



Checking the electrical system

TIP

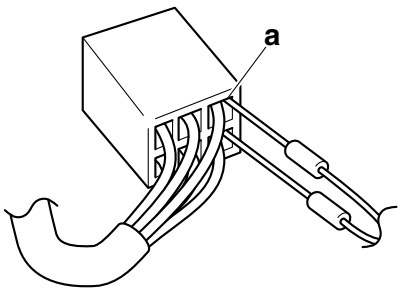
Before checking the electrical system, make sure that the battery voltage is at least 12 V.



ECA14371

NOTICE

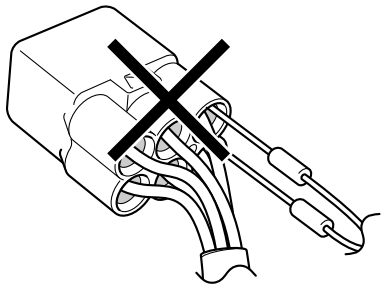
Never insert the tester probes into the coupler terminal slots. Always insert the probes from the opposite end "a" of the coupler, taking care not to loosen or damage the leads.



ECA16640

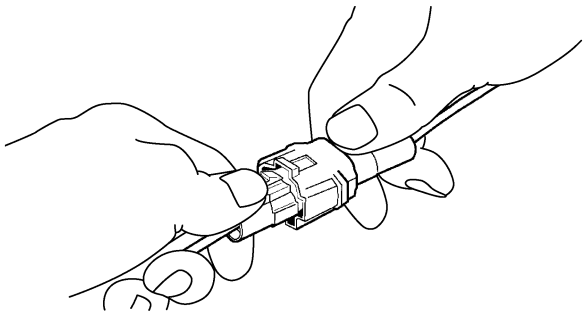
NOTICE

For waterproof couplers, never insert the tester probes directly into the coupler. When performing any checks using a waterproof coupler, use the specified test harness or a suitable commercially available test harness.

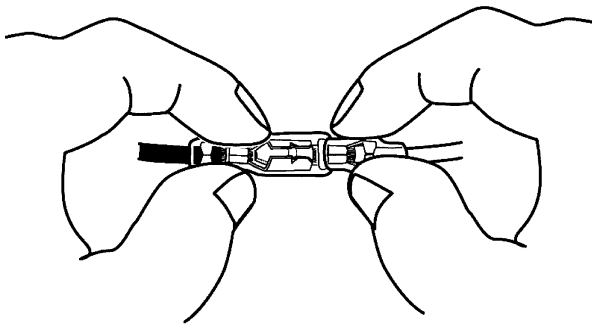


Checking the connections
Check the leads, couplers, and connectors for stains, rust, moisture, etc.
1. Disconnect:
   • Lead
   • Coupler
   • Connector

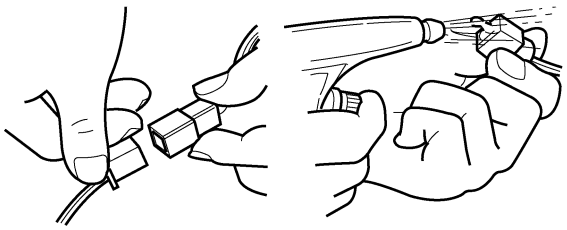
ECA16780
NOTICE
• When disconnecting a coupler, release the coupler lock, hold both sections of the coupler securely, and then disconnect the coupler.
• There are many types of coupler locks; therefore, be sure to check the type of coupler lock before disconnecting the coupler.



ECA16790
NOTICE
When disconnecting a connector, do not pull the leads. Hold both sections of the connector securely, and then disconnect the connector.

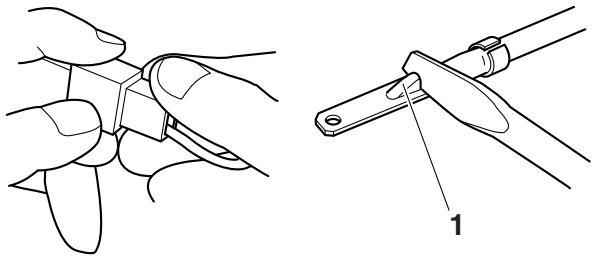


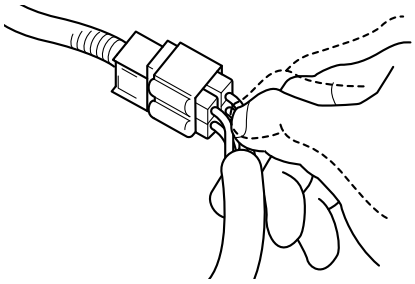
2. Check:
   • Lead
   • Coupler
   • Connector
   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.



3. Check:
   • All connections
   Loose connection → Connect properly.

TIP
• If the pin "1" on the terminal is flattened, bend it up.
• After disassembling and assembling a coupler, pull on the leads to make sure that they are installed securely.

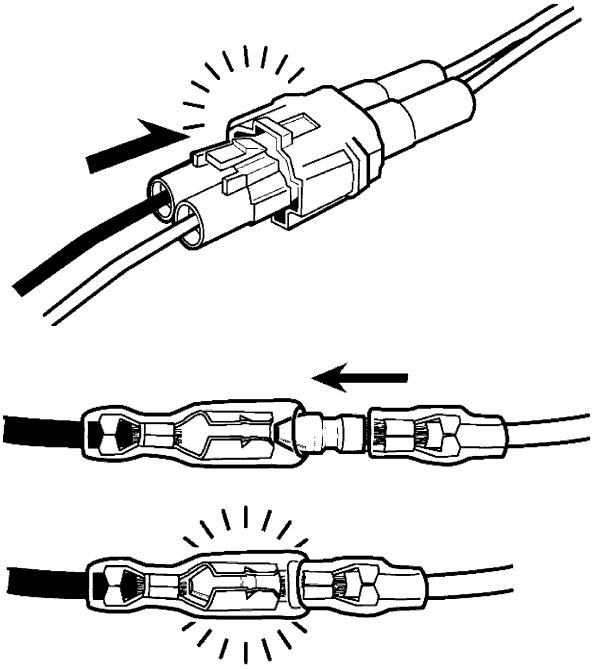




4. Connect:
   • Lead
   • Coupler
   • Connector

TIP

- When connecting a coupler or connector, push both sections of the coupler or connector together until they are connected securely.
- Make sure all connections are tight.

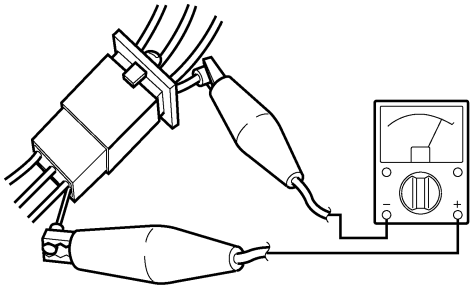


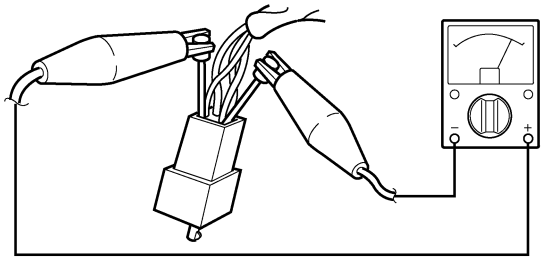
5. Check:
   • Continuity
   (with the pocket tester)

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (4).
- As a quick remedy, use a contact revitalizer available at most part stores.



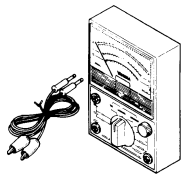
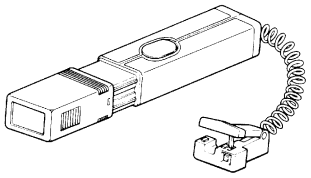
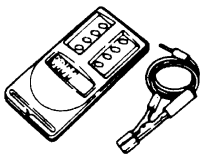
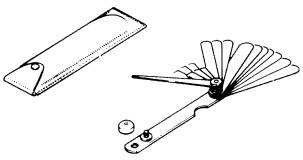
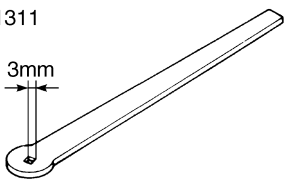
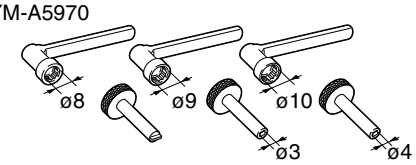
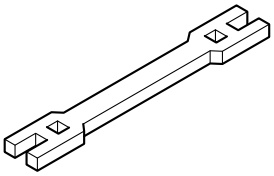


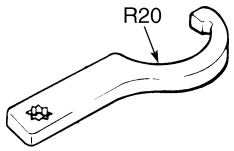
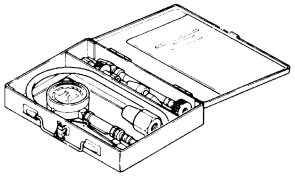
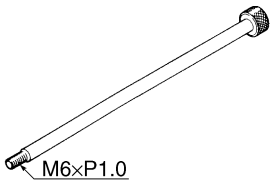
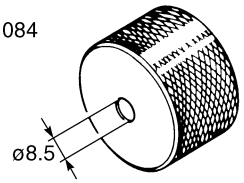
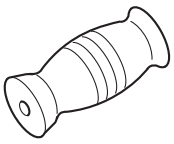
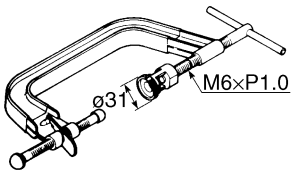
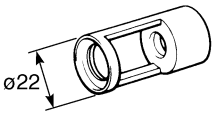
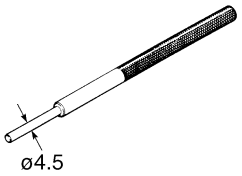
EAS20260
SPECIAL TOOLS

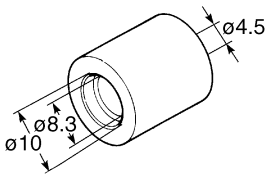
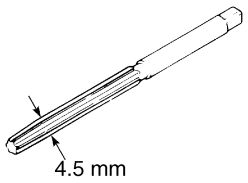
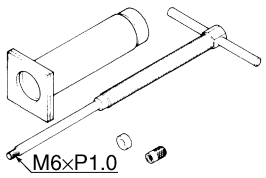
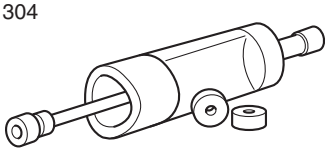
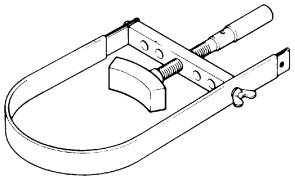
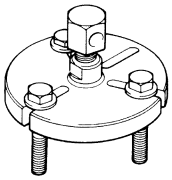
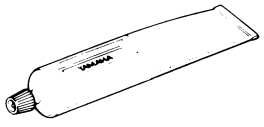
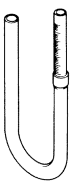
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

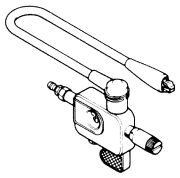
TIP

- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

Tool name/Tool No.	Illustration	Reference pages
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-8, 5-28, 7-21, 7-22, 7-25, 7-26, 7-27, 7-28, 7-29
Timing light 90890-03141 YU-03141		3-4
Digital tachometer 90890-06760 YU-39951-B		3-4, 3-7
Thickness gauge 90890-03079 Narrow gauge set YM-34483		3-5, 5-39
Tappet adjusting tool 90890-01311 Six piece tappet set YM-A5970	90890-01311  YM-A5970 	3-5
Spoke nipple wrench (10–11) 90890-01523 YM-01523		3-12

Tool name/Tool No.	Illustration	Reference pages
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-16, 4-21
Compression gauge 90890-03081 Engine compression tester YU-33223		5-1
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1		5-12
Weight 90890-01084 YU-01083-3	90890-01084  YU-01083-3 	5-12
Valve spring compressor 90890-04019 YM-04019		5-16, 5-21
Valve spring compressor attachment 90890-04108 Valve spring compressor adapter 22 mm YM-04108		5-16, 5-21
Valve guide remover (ø4.5) 90890-04116 Valve guide remover (4.5 mm) YM-04116		5-17

Tool name/Tool No.	Illustration	Reference pages
Valve guide installer (ø4.5) 90890-04117 Valve guide installer (4.5 mm) YM-04117		5-17
Valve guide reamer (ø4.5) 90890-04118 Valve guide reamer (4.5 mm) YM-04118		5-17
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-23
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-32, 5-35, 5-39, 5-41
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-32
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-33, 5-50
Fuel level gauge 90890-01312 YM-01312-A		6-8

Tool name/Tool No.	Illustration	Reference pages
Ignition checker 90890-06754 Oppama pet-4000 spark checker YM-34487		7-26

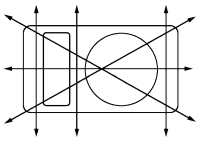
SPECIFICATIONS

EAS20280
GENERAL SPECIFICATIONS

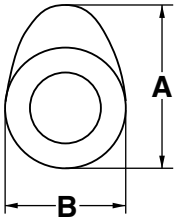
Model	
Model	1P6V (CAN) 1P6W (EUR) (ZAF) 1P6X (OCE)
Dimensions	
Overall length	1305 mm (51.4 in)
Overall width	595 mm (23.4 in)
Overall height	795 mm (31.3 in)
Seat height	555 mm (21.9 in)
Wheelbase	925 mm (36.4 in)
Ground clearance	135 mm (5.31 in)
Weight	
Curb weight	57 kg (126 lb)

EAS20290
ENGINE SPECIFICATIONS

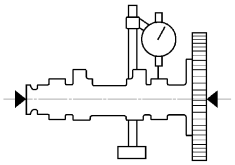
Engine	
Engine type	Air cooled 4-stroke, SOHC
Displacement	49 cm^3
Cylinder arrangement	Single cylinder
Bore × stroke	36.0 × 48.6 mm (1.42 × 1.91 in)
Compression ratio	9.50 : 1
Standard compression pressure (at sea level)	1300 kPa/600 r/min (13.0 kgf/cm^2/600 r/min, 184.9 psi/600 r/min)
Starting system	Electric starter
Fuel	
Recommended fuel	Regular unleaded gasoline or gasohol (E10) (CAN) (EUR) (ZAF) Unleaded gasoline or gasohol (E10) (OCE)
Fuel tank capacity	3.1 L (0.82 US gal, 0.68 Imp.gal)
Fuel reserve amount	0.4 L (0.11 US gal, 0.09 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Recommended brand	YAMALUBE
Type	SAE 10W-30, 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Total amount	1.00 L (1.06 US qt, 0.88 Imp.qt)
Periodic oil change	0.80 L (0.85 US qt, 0.70 Imp.qt)
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	0.150 mm or less (0.0059 in or less)
Limit	0.23 mm (0.0091 in)
Outer-rotor-to-oil-pump-housing clearance	0.07 mm (0.0028 in)
Limit	0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.06–0.10 mm (0.0024–0.0039 in)
Limit	0.17 mm (0.0067 in)
Rotor thickness	5.98–6.00 mm (0.2354–0.2362 in)
Spark plug(s)	
Manufacturer/model	NGK/CR7HSA
Spark plug gap	0.6–0.7 mm (0.024–0.028 in)
Cylinder head	
Combustion chamber volume	3.60–3.80 cm^3 (0.22–0.23 cu.in)
Warpage limit	0.05 mm (0.0020 in)



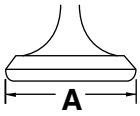
Camshaft	
Drive system	Chain drive (left)
Camshaft lobe dimensions	
Intake A	25.428–25.528 mm (1.0011–1.0050 in)
Limit	25.328 mm (0.9972 in)
Intake B	21.034–21.134 mm (0.8281–0.8320 in)
Limit	20.934 mm (0.8242 in)
Exhaust A	25.286–25.386 mm (0.9955–0.9994 in)
Limit	25.186 mm (0.9916 in)
Exhaust B	21.047–21.147 mm (0.8286–0.8326 in)
Limit	20.947 mm (0.8247 in)



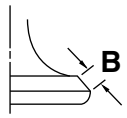
Camshaft runout limit	0.030 mm (0.0012 in)



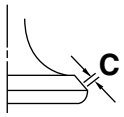
Timing chain	
Tensioning system	Automatic
Rocker arm/rocker arm shaft	
Rocker arm inside diameter	10.000–10.015 mm (0.3937–0.3943 in)
Limit	10.025 mm (0.3947 in)
Rocker arm shaft outside diameter	9.981–9.991 mm (0.3930–0.3933 in)
Limit	9.976 mm (0.3928 in)
Rocker-arm-to-rocker-arm-shaft clearance	0.009–0.034 mm (0.0004–0.0013 in)
Limit	0.049 mm (0.0019 in)
Valve, valve seat, valve guide	
Valve clearance (cold)	
Intake	0.05–0.09 mm (0.0020–0.0035 in)
Exhaust	0.08–0.12 mm (0.0032–0.0047 in)
Valve dimensions	
Valve head diameter A (intake)	16.90–17.10 mm (0.6654–0.6732 in)
Valve head diameter A (exhaust)	14.40–14.60 mm (0.5669–0.5748 in)



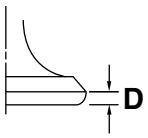
Valve face width B (intake)	1.050–1.550 mm (0.0413–0.0610 in)
Valve face width B (exhaust)	1.050–1.550 mm (0.0413–0.0610 in)



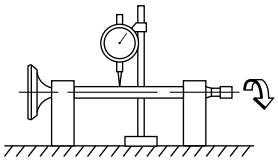
Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)
Limit	1.6 mm (0.06 in)



Valve margin thickness D (intake)	0.50–0.90 mm (0.0197–0.0354 in)
Valve margin thickness D (exhaust)	0.50–0.90 mm (0.0197–0.0354 in)



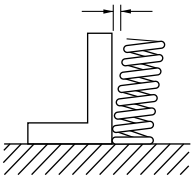
Valve stem diameter (intake)	4.475–4.490 mm (0.1762–0.1768 in)
Limit	4.445 mm (0.1750 in)
Valve stem diameter (exhaust)	4.460–4.475 mm (0.1756–0.1762 in)
Limit	4.430 mm (0.1744 in)
Valve guide inside diameter (intake)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.550 mm (0.1791 in)
Valve guide inside diameter (exhaust)	4.500–4.512 mm (0.1772–0.1776 in)
Limit	4.550 mm (0.1791 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)	0.025–0.052 mm (0.0010–0.0020 in)
Limit	0.100 mm (0.0039 in)
Valve stem runout	0.010 mm (0.0004 in)



Valve spring

Free length (intake)	32.45 mm (1.28 in)
Limit	30.83 mm (1.21 in)
Free length (exhaust)	32.45 mm (1.28 in)
Limit	30.83 mm (1.21 in)
Installed length (intake)	24.20 mm (0.95 in)
Installed length (exhaust)	24.20 mm (0.95 in)

Spring rate K1 (intake)	17.94 N/mm (1.83 kgf/mm, 102.44 lb/in)
Spring rate K2 (intake)	23.28 N/mm (2.37 kgf/mm, 132.93 lb/in)
Spring rate K1 (exhaust)	17.94 N/mm (1.83 kgf/mm, 102.44 lb/in)
Spring rate K2 (exhaust)	23.28 N/mm (2.37 kgf/mm, 132.93 lb/in)
Installed compression spring force (intake)	138.00–158.00 N (14.07–16.11 kgf, 31.02–35.52 lbf)
Installed compression spring force (exhaust)	138.00–158.00 N (14.07–16.11 kgf, 31.02–35.52 lbf)
Spring tilt (intake)	1.4 mm (0.06 in)
Spring tilt (exhaust)	1.4 mm (0.06 in)



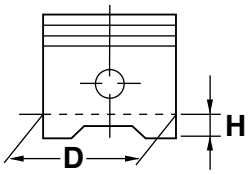
Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

Cylinder

Bore	35.995–36.015 mm (1.4171–1.4179 in)
Wear limit	36.050 mm (1.4193 in)
Warp limit	0.05 mm (0.0020 in)

Piston

Piston-to-cylinder clearance	0.030–0.040 mm (0.0012–0.0016 in)
Diameter D	35.960–35.980 mm (1.4157–1.4165 in)
Height H	5.0 mm (0.20 in)

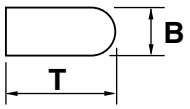


Offset	0.50 mm (0.0197 in)
Offset direction	Intake side
Piston pin bore inside diameter	12.002–12.013 mm (0.4725–0.4730 in)
Limit	12.043 mm (0.4741 in)
Piston pin outside diameter	11.996–12.000 mm (0.4723–0.4724 in)
Limit	11.976 mm (0.4715 in)
Piston-pin-to-piston-pin-bore clearance	0.002–0.017 mm (0.0001–0.0007 in)
Limit	0.067 mm (0.0026 in)

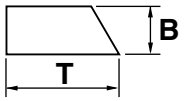
Piston ring

Top ring	
Ring type	Barrel

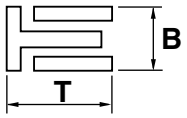
Dimensions (B × T)	1.60 × 0.80 mm (0.06 × 0.03 in)



End gap (installed)	0.10–0.25 mm (0.0039–0.0098 in)
Limit	0.50 mm (0.0197 in)
Ring side clearance	0.020–0.070 mm (0.0008–0.0028 in)
Limit	0.120 mm (0.0047 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	1.60 × 0.80 mm (0.06 × 0.03 in)



End gap (installed)	0.15–0.30 mm (0.0059–0.0118 in)
Limit	0.65 mm (0.0256 in)
Ring side clearance	0.020–0.060 mm (0.0008–0.0024 in)
Limit	0.120 mm (0.0047 in)
Oil ring	
Dimensions (B × T)	1.60 × 1.50 mm (0.06 × 0.06 in)



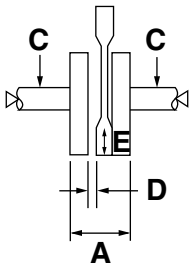
End gap (installed)	0.20–0.70 mm (0.0079–0.0276 in)

Connecting rod

Small end inside diameter	12.015–12.028 mm (0.4730–0.4735 in)

Crankshaft

Width A	42.95–43.00 mm (1.691–1.693 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.100–0.400 mm (0.0039–0.0157 in)
Limit	0.50 mm (0.0197 in)
Big end radial clearance E	0.010–0.025 mm (0.0004–0.0010 in)
Limit	0.09 mm (0.0035 in)



Clutch	
Clutch type	Wet, multiple-disc and centrifugal automatic
Friction plate thickness	2.92–3.08 mm (0.115–0.121 in)
Wear limit	2.82 mm (0.1110 in)
Plate quantity	2 pcs
Clutch plate thickness	1.85–2.15 mm (0.073–0.085 in)
Plate quantity	1 pc
Warpage limit	0.20 mm (0.0079 in)
Clutch plate thickness	1.95–2.05 mm (0.077–0.081 in)
Plate quantity	1 pc
Warpage limit	0.20 mm (0.0079 in)
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	1 pc
Warpage limit	0.20 mm (0.0079 in)
Automatic centrifugal clutch	
Clutch-in revolution	2300–2700 r/min
Clutch-stall revolution	3210–3710 r/min
Transmission	
Transmission type	Constant mesh 3-speed
Primary reduction ratio	3.722 (67/18)
Final drive	Chain
Secondary reduction ratio	2.846 (37/13)
Operation	Left foot operation
Gear ratio	
1st	3.250 (39/12)
2nd	1.736 (33/19)
3rd	1.217 (28/23)
Main axle runout limit	0.08 mm (0.0032 in)
Drive axle runout limit	0.08 mm (0.0032 in)
Shifting mechanism	
Shift mechanism type	Shift drum and guide bar
Shift fork thickness	4.76–4.89 mm (0.1874–0.1925 in)
Air filter	
Air filter element	Wet element
Air filter oil grade	Yamaha foam air filter oil or other quality foam air filter oil
Carburetor	
Type × quantity	VM11 × 1
ID mark	1P6W 20
Main jet	#62.5
Main air jet	1.4
Jet needle	4DL22-1
Needle jet	E-2M
Pilot outlet	0.8 × 1.5
Pilot jet	#12.5
Valve seat size	1.2
Starter jet 1	#20
Starter jet 2	0.6
Float height	18.5 mm (0.73 in)
Fuel level A (using fuel level gauge)	2.0–3.0 mm (0.08–0.12 in)

Idling condition	
Engine idling speed	1600–1800 r/min
CO%	4.0–6.0 %
Oil temperature	55.0–65.0 °C (131.00–149.00 °F)
Throttle grip free play	3.0–5.0 mm (0.12–0.20 in)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Backbone
Caster angle	25.50 °
Trail	34 mm (1.3 in)
Front wheel	
Wheel type	Spoke wheel
Rim size	10 × 1.40
Rim material	Steel
Wheel travel	96.0 mm (3.78 in)
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Rear wheel	
Wheel type	Spoke wheel
Rim size	10 × 1.40
Rim material	Steel
Wheel travel	71.0 mm (2.80 in)
Radial wheel runout limit	2.0 mm (0.08 in)
Lateral wheel runout limit	2.0 mm (0.08 in)
Front tire	
Type	With tube
Size	2.50-10 4PR
Manufacturer/model	CHENG SHIN/C183A
Wear limit (front)	4.0 mm (0.16 in)
Rear tire	
Type	With tube
Size	2.50-10 4PR
Manufacturer/model	CHENG SHIN/C183A
Wear limit (rear)	4.0 mm (0.16 in)
Tire air pressure (measured on cold tires)	
Front	100 kPa (1.00 kgf/cm^2, 15 psi)
Rear	100 kPa (1.00 kgf/cm^2, 15 psi)
Front brake	
Type	Drum brake
Operation	Right hand operation
Front brake lever free play	10.0–20.0 mm (0.39–0.79 in)
Front drum brake	
Drum brake type	Leading, trailing
Brake drum inside diameter	80.0 mm (3.15 in)
Limit	80.5 mm (3.17 in)
Lining thickness	3.5 mm (0.14 in)
Limit	1.5 mm (0.06 in)
Shoe spring free length	32.0 mm (1.26 in)
Rear brake	
Type	Drum brake
Operation	Right foot operation
Brake pedal free play	10.0–20.0 mm (0.39–0.79 in)

Rear drum brake	
Drum brake type	Leading, trailing
Brake drum inside diameter	80.0 mm (3.15 in)
Limit	80.5 mm (3.17 in)
Lining thickness	3.5 mm (0.14 in)
Limit	1.5 mm (0.06 in)
Shoe spring free length	32.0 mm (1.26 in)
Steering	
Steering bearing type	Ball bearing
Center to lock angle (left)	45.0 °
Center to lock angle (right)	45.0 °
No./size of steel balls	
(Upper)	19 pcs
(Lower)	16 pcs
Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring
Front fork travel	96.0 mm (3.78 in)
Fork spring free length	156.1 mm (6.15 in)
Limit	153.0 mm (6.02 in)
Installed length	154.5 mm (6.08 in)
Spring rate K1	7.95 N/mm (0.81 kgf/mm, 45.39 lb/in)
Spring rate K2	10.50 N/mm (1.07 kgf/mm, 59.96 lb/in)
Spring stroke K1	0.0–80.0 mm (0.00–3.15 in)
Spring stroke K2	80.0–96.0 mm (3.15–3.78 in)
Inner tube outer diameter	21.7 mm (0.85 in)
Optional spring available	No
Rear suspension	
Type	Swingarm
Spring/shock absorber type	Coil spring/oil damper
Rear shock absorber assembly travel	47.0 mm (1.85 in)
Spring free length	114.0 mm (4.49 in)
Installed length	110.0 mm (4.33 in)
Spring rate K1	29.00 N/mm (2.96 kgf/mm, 165.59 lb/in)
Spring stroke K1	0.0–47.0 mm (0.00–1.85 in)
Optional spring available	No
Swingarm	
Swingarm end free play limit (radial)	1.0 mm (0.04 in)
Swingarm end free play limit (axial)	0.3 mm (0.01 in)
Drive chain	
Type/manufacturer	420/KMC
Number of links	80
Drive chain slack	35.0–45.0 mm (1.38–1.77 in)
15-link length limit	194.3 mm (7.65 in)

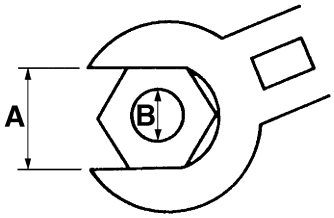
EAS20310
ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	DC CDI
Advancer type	Digital
Ignition timing (B.T.D.C.)	10.0 °/1700 r/min
Ignition coil	
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	0.32–0.48 Ω
Secondary coil resistance	5.68–8.52 kΩ
Spark plug cap	
Material	Resin
Resistance	10.0 kΩ
AC magneto	
Standard output	14.0 V, 80 W@5000 r/min
Charging coil resistance	0.96–1.44 Ω (B-W)
Lighting coil resistance	0.80–1.20 Ω (B-Y)
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Regulated voltage (DC)	14.0–15.0 V
Regulated voltage (AC)	13.0–14.0 V
Rectifier capacity (DC)	8.0 A
Rectifier capacity (AC)	8.0 A
Battery	
Model	GT4B-5
Voltage, capacity	12 V, 2.5 Ah
Specific gravity	1.35
Manufacturer	GS YUASA
Ten hour rate amperage	0.25 A
Electric starting system	
System type	Constant mesh
Starter motor	
Power output	0.25 kW
Armature coil resistance	0.0351–0.0429 Ω
Brush overall length	7.0 mm (0.28 in)
Limit	3.50 mm (0.14 in)
Brush spring force	3.92–5.88 N (400–600 gf, 14.11–21.17 oz)
Commutator diameter	17.6 mm (0.69 in)
Limit	16.6 mm (0.65 in)
Mica undercut (depth)	1.35 mm (0.05 in)
Starter relay	
Amperage	30.0 A
Coil resistance	72.00–88.00 Ω
Fuse	
Fuse	10.0 A
Spare fuse	10.0 A

EAS20320
TIGHTENING TORQUES

EAS20331
GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A. Distance between flats
B. Outside thread diameter

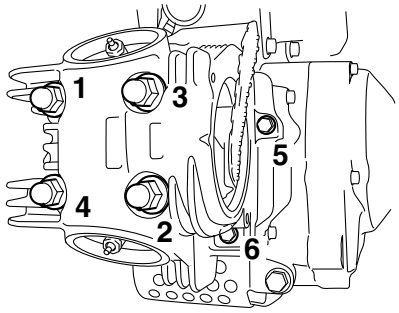
A (nut)	B (bolt)	General tightening torques		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

EAS20340
ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	1	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Locknut (valve adjusting screw)	M5	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Crankshaft end cover	M32	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Timing mark accessing screw	M14	1	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Camshaft sprocket cover bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Exhaust tappet cover	M45	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Intake tappet cover	M45	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Exhaust pipe nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Muffler bolt	M8	1	38 Nm (3.8 m·kg, 27 ft·lb)	
Tailpipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil drain bolt	M12	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Heat protector bolt (silencer)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Heat protector bolt (rear)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Heat protector bolt (front)	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Shift pedal bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Intake manifold bolt (cylinder head side)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Cylinder head nut	M8	4	22 Nm (2.2 m·kg, 16 ft·lb)	
Cylinder head bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner cap bolt	M8	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Camshaft sprocket bolt	M8	1	26 Nm (2.6 m·kg, 19 ft·lb)	
Camshaft retainer bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Stator assembly lead holder bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
AC magneto rotor nut	M12	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
AC magneto cover	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Starter clutch bolt	M6	3	14 Nm (1.4 m·kg, 10 ft·lb)	Stake
Clutch cover bolt	M6	9	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Pressure plate bolt	M5	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Clutch release adjusting locknut	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Clutch housing nut	M14	1	70 Nm (7.0 m·kg, 51 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Primary driven gear nut	M14	1	70 Nm (7.0 m·kg, 51 ft·lb)	
Stopper bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	LT
Oil pump screw	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Timing chain guide bolt (intake)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Crankcase bolt	M6	10	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Neutral switch	M10	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Intake manifold bolt (carburetor side)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Air filter joint clamp screw	M6	2	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Carburetor warmer	M8	1	3 Nm (0.3 m·kg, 2.2 ft·lb)	Apply HEAT SINKER.
Starter plunger	M8	1	4 Nm (0.4 m·kg, 2.9 ft·lb)	

TIP
Tighten the cylinder head nuts and bolts in the proper tightening sequence as shown and torque them in two stages.



EAS20350
CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting nut (front side)	M8	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Engine mounting nut (rear upper side)	M8	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Engine mounting nut (rear lower side)	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Engine bracket bolt	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Engine guard bolt	M8	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Air scoop screw	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel tank bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear fender and seat screw	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel cock bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front fender bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front fork guard bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Battery cover bolt	M6	2	5 Nm (0.5 m·kg, 3.6 ft·lb)	
Side cover and seat screw	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel axle nut	M12	1	35 Nm (3.5 m·kg, 25 ft·lb)	
Spoke	—	56	2 Nm (0.2 m·kg, 1.4 ft·lb)	
Front brake cable lock nut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Front brake camshaft lever nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Both lock nut (drive chain adjuster)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake camshaft lever nut	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel axle nut	M12	1	60 Nm (6.0 m·kg, 43 ft·lb)	
Rear wheel sprocket bolt	M8	4	25 Nm (2.5 m·kg, 18 ft·lb)	
Handlebar nut	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Lower ring nut (final tightening torque)	M25	1	4 Nm (0.4 m·kg, 2.9 ft·lb)	See TIP.
Steering stem nut	M22	1	110 Nm (11.0 m·kg, 80 ft·lb)	
Front fork assembly bolt	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Drive chain guard bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive chain support bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear shock absorber nut	M10	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Pivot shaft nut	M10	1	35 Nm (3.5 m·kg, 25 ft·lb)	
Drive sprocket cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Footrest bolt	M8	4	30 Nm (3.0 m·kg, 22 ft·lb)	
Sidestand nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	

TIP

1. First, tighten the ring nut to approximately 38 Nm (3.8 m·kg, 27 ft·lb) with a torque wrench, and turn the steering right and left a few times, then loosen the ring nut completely.
2. Retighten the ring nut 4 Nm (0.4 m·kg, 2.9 ft·lb).

EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings	E
Cylinder head nut and washer	E
Cylinder head bolt and washer	E
Cylinder head stud bolt and washer	E
Camshaft sprocket (crank shaft)	M
Crankshaft pin	E
Cylinder	E
Piston pin	E
Piston surface, piston rings and ring grooves	E
Camshaft lobes	M
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	M
Rocker arm shaft	M
Rocker arm inner surface	M
Rocker arm hole	E
Timing mark accessing screw and O-ring	E
Crankshaft end cover and O-ring	E
Starter clutch idle gear inner surface	E
Starter clutch idle gear shaft	E
Starter clutch gear inner surface	M
Starter clutch assembly	E
Bushing (clutch)	E
Pressure plate	E
Primary driven gear nut	E
Primary drive gear	E
Guide pin (clutch)	E
Clutch housing nut	E
Clutch plates	E

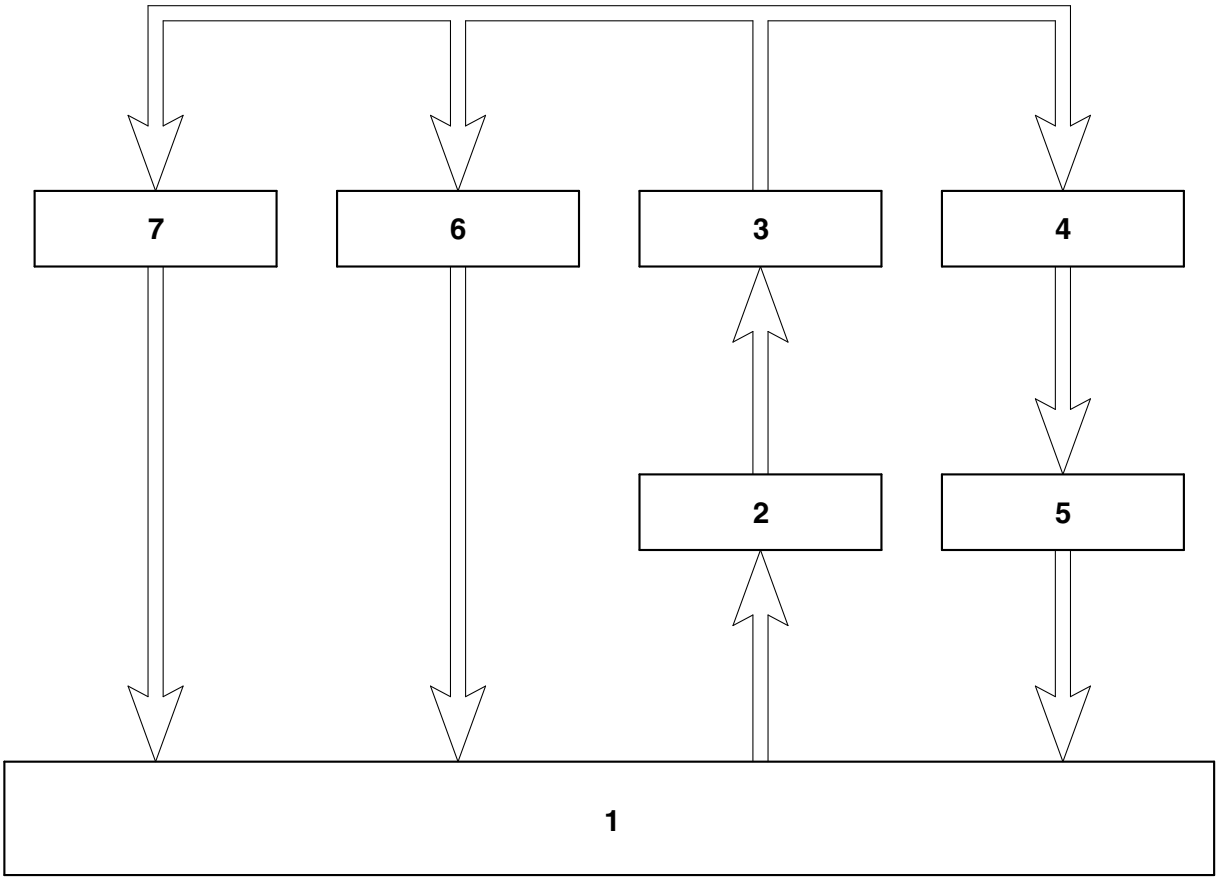
Lubrication point	Lubricant
Shift lever	E
Transmission gears (wheel and pinion)	M
Main axle and drive axle	M
Shift lever inner surface	E
Shift forks and guide bar	E
Shift drum	E
Oil pump drive gear	E
Oil pump rotor (inner and outer)	E
Oil pump shaft	E
Shift shaft	E
Stopper bolt	E
Pickup coil/stator coil assembly lead grommet	Yamaha bond No.1215 (Three bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three bond No.1215®)

EAS20380
CHASSIS

Lubrication point	Lubricant
Drive chain	E
Upper bearing balls and lower bearing balls (steering head)	LS
Upper bearing inner race and upper bearing outer race	LS
Lower bearing inner race and upper bearing outer race	LS
Upper bearing race cover lip	LS
Lower bearing dust seal lip	LS
Pivot shaft	LS
Front wheel oil seal lip	LS
Front brake camshaft	LS
Front brake camshaft oil seal lip	LS
Front brake shoe plate pivot pin	LS
Rear wheel drive hub oil seal lip	LS
Rear wheel axle	LS
Rear brake camshaft	LS
Rear brake camshaft oil seal lip	LS
Rear brake shoe plate pivot pin	LS
Throttle grip inner tube guide inner surface and throttle cable end	LS
Brake lever pivot bolt outer surface	LS
Front brake cable end	LS
Inner tube assembly (left and right)	LS
Brake pedal inner surface	LS
Sidestand pivoting point and collar	LS
Throttle cable rubber cover inner surface	S

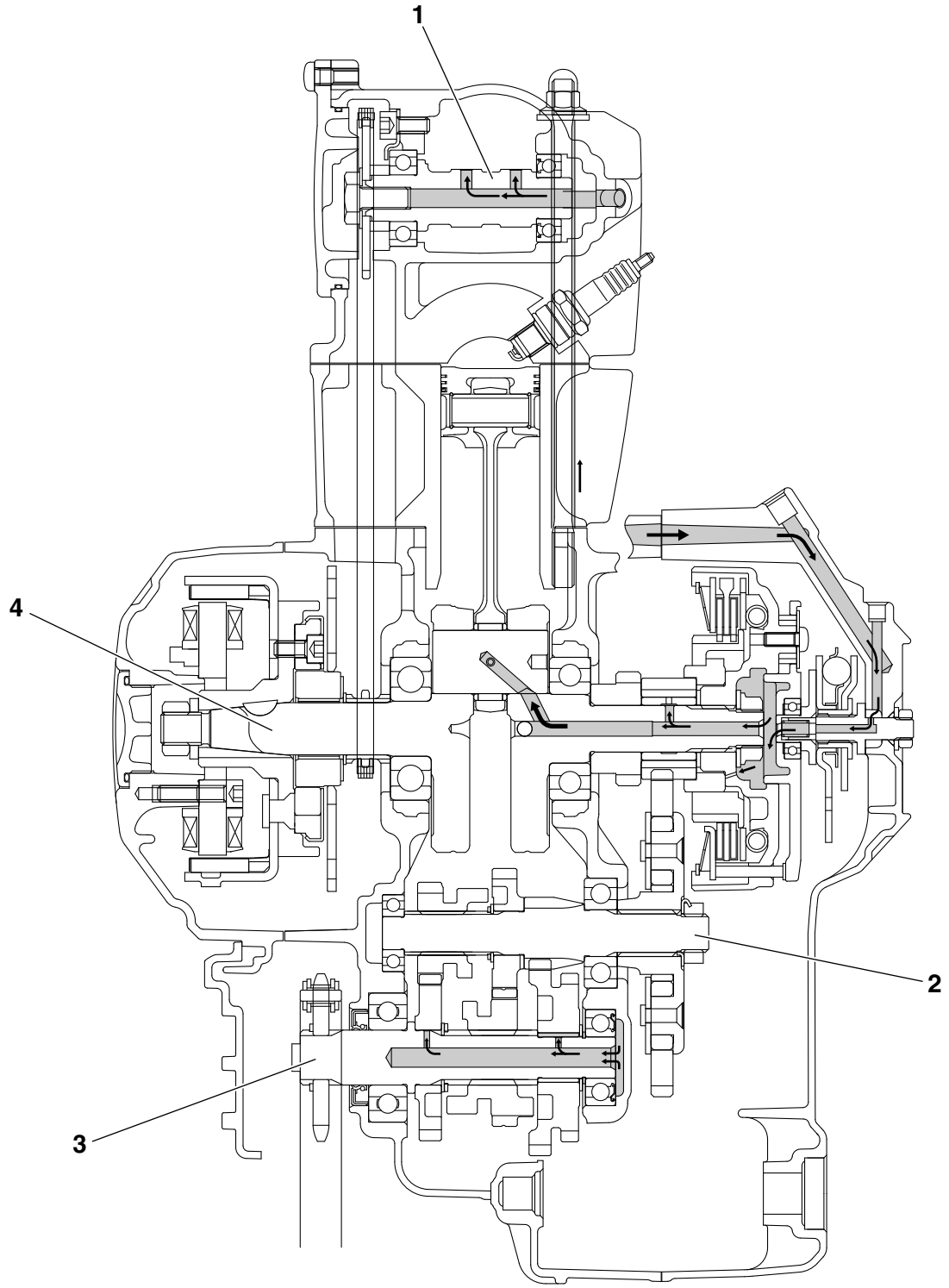
EAS20390
LUBRICATION SYSTEM DIAGRAMS

EAS20400
ENGINE OIL LUBRICATION CHART

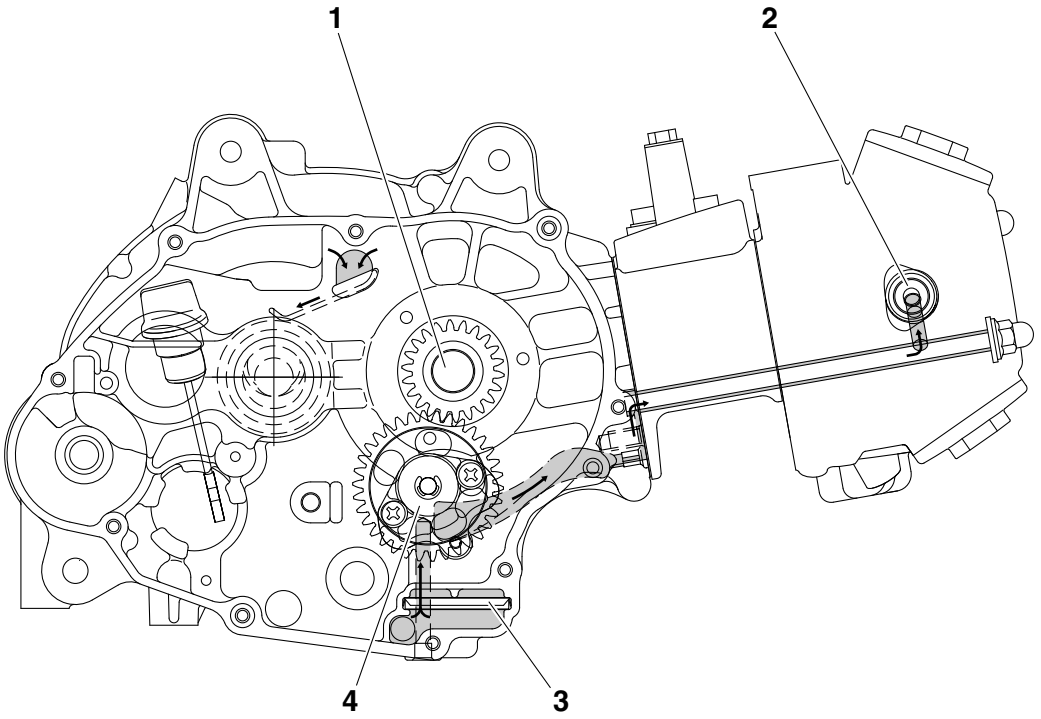


1. Bottom of the crankcase
2. Oil strainer
3. Oil pump
4. Cylinder head
5. Camshaft
6. Crankshaft
7. Drive axle

EAS20410
LUBRICATION DIAGRAMS



1. Camshaft
2. Main axle
3. Drive axle
4. Crankshaft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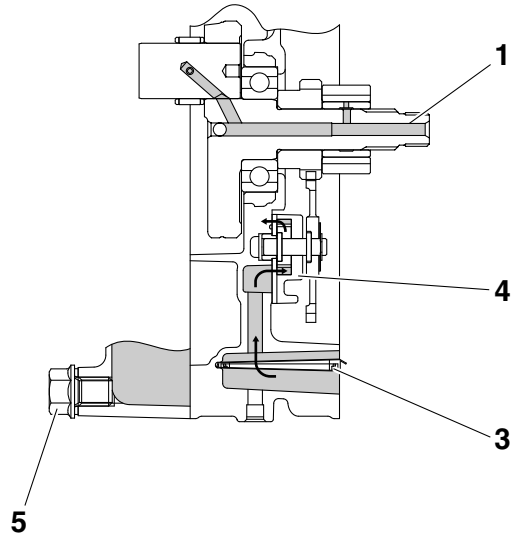
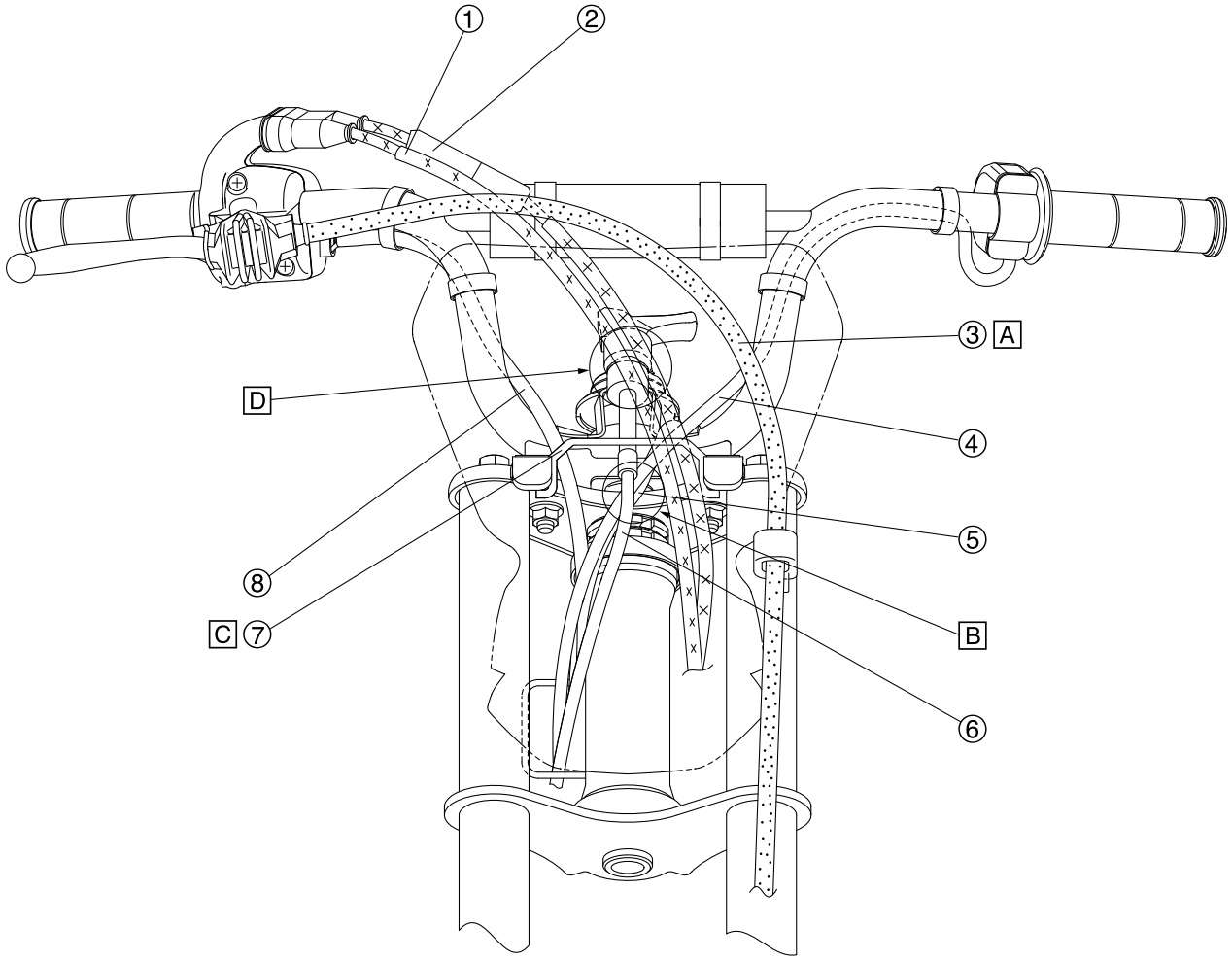
2
4
3


1
4
3
5

1. Crankshaft
2. Camshaft
3. Oil strainer
4. Oil pump
5. Engine oil drain bolt

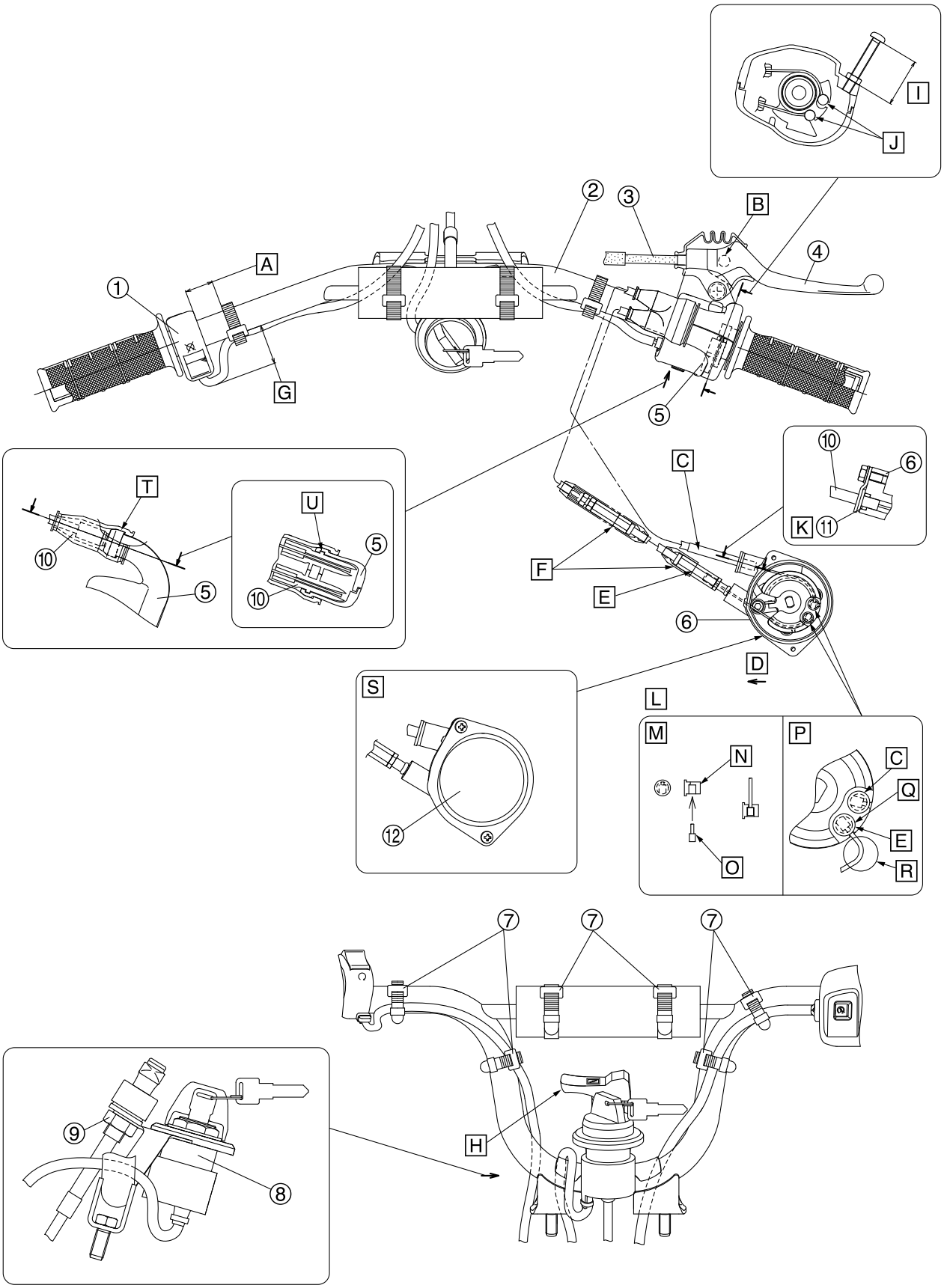
EAS20430
CABLE ROUTING
Handlebar (front view)



1. Throttle cable (decelerator cable)
2. Throttle cable (accelerator cable)
3. Brake cable
4. Engine stop switch lead
5. Main switch lead
6. Starter cable
7. Cable guide
8. Start switch lead

A. Route the brake cable to the front of the front fender.
B. Route the starter cable, engine stop switch lead, and main switch lead to the front of the upper bracket in the order listed from front to rear.
C. Route the throttle cable (accelerator cable), throttle cable (decelerator cable), engine stop switch lead, main switch lead, start switch lead, and starter cable through the cable guide.
D. Route the throttle cable (accelerator cable) and throttle cable (decelerator cable) to the front of the starter cable.

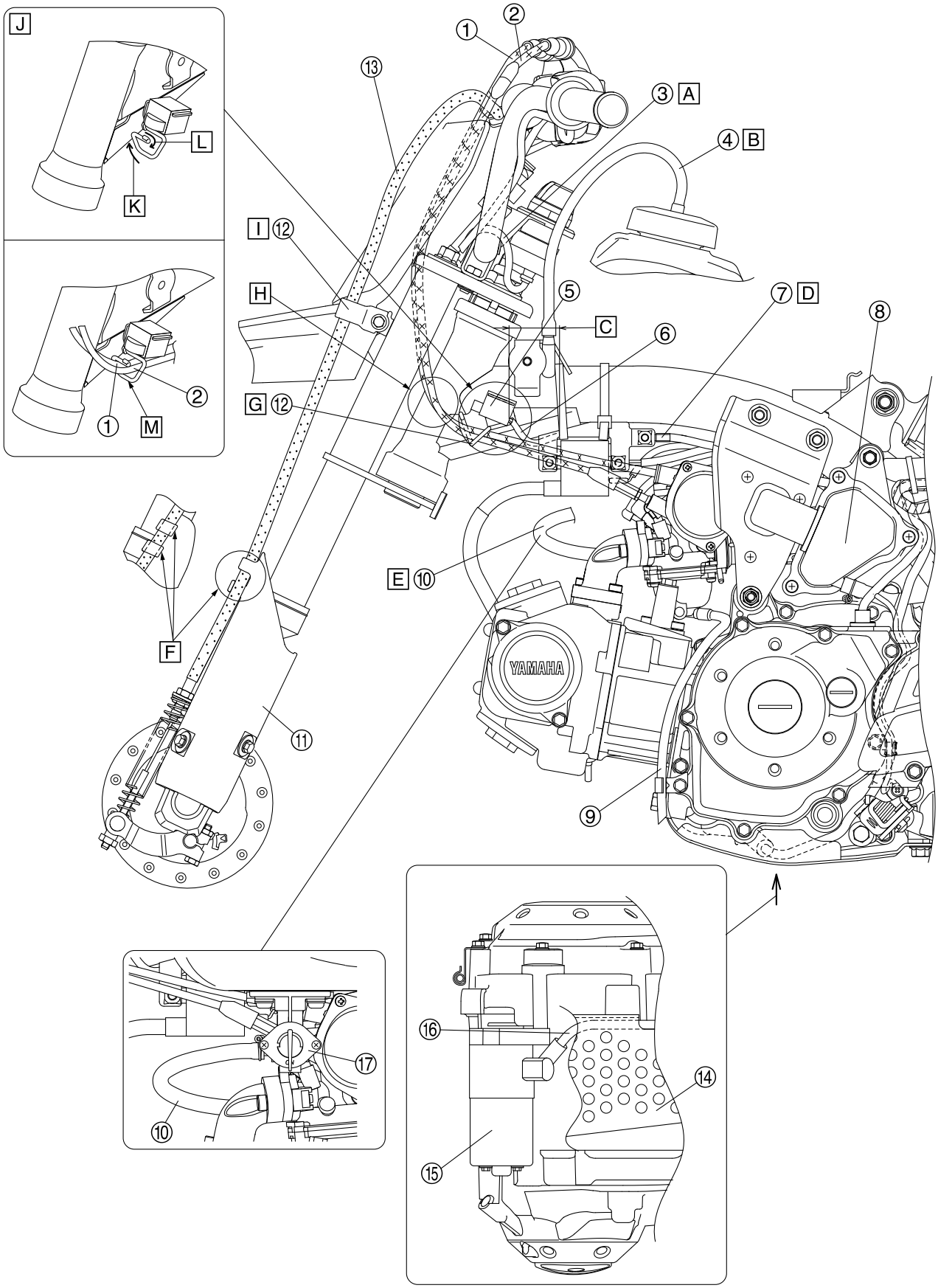
Handlebar (top view)



1. Engine stop switch
2. Handlebar
3. Brake cable
4. Brake lever
5. Throttle grip housing
6. Carburetor
7. Plastic band
8. Main switch
9. Starter cable
10. Throttle cable
11. O-ring
12. Throttle shaft case cover

A. Position the plastic band 20–30 mm (0.79–1.18 in) from the engine stop switch.
B. Apply lithium-soap-based grease to the installation area of the brake cable and brake lever.
C. Decelerator side
D. Front side
E. Accelerator side
F. After adjusting the throttle grip free play, place the rubber cover as shown in the illustration. May apply silicon grease on the installation.
G. Slack the engine stop switch lead 20–30 mm (0.79–1.18 in) from the handle bar.
H. Install the starter lever pointing to the left of the vehicle.
I. 28 mm (1.10 in)
J. Apply lithium-soap-based grease to the installation area of the throttle cables and throttle grip assembly.
K. Apply lithium-soap-based grease to the O-ring when installing to the carburetor assembly. Install the O-ring to the carburetor assembly, and then install the throttle cable to the carburetor assembly.
L. Installation procedure of the throttle cables to the carburetor assembly.
M. Install the throttle cable to the throttle cable end.
N. Throttle cable end
O. Throttle cable
P. Install the throttle cables to the carburetor assembly as shown in the illustration. (Not use the pliers)
Q. Insert the throttle cable end until the cable is inside of the pulley.
R. Do not use pliers in this area. (To avoid sharp bend on the cable.)
S. Check that the throttle cable operates properly, and then install the throttle shaft case cover.
T. Push in the boot of the throttle cable until it over the protrusion on the throttle grip housing.
U. Install the protrusion on the wire guide of the throttle cable to the throttle grip housing.

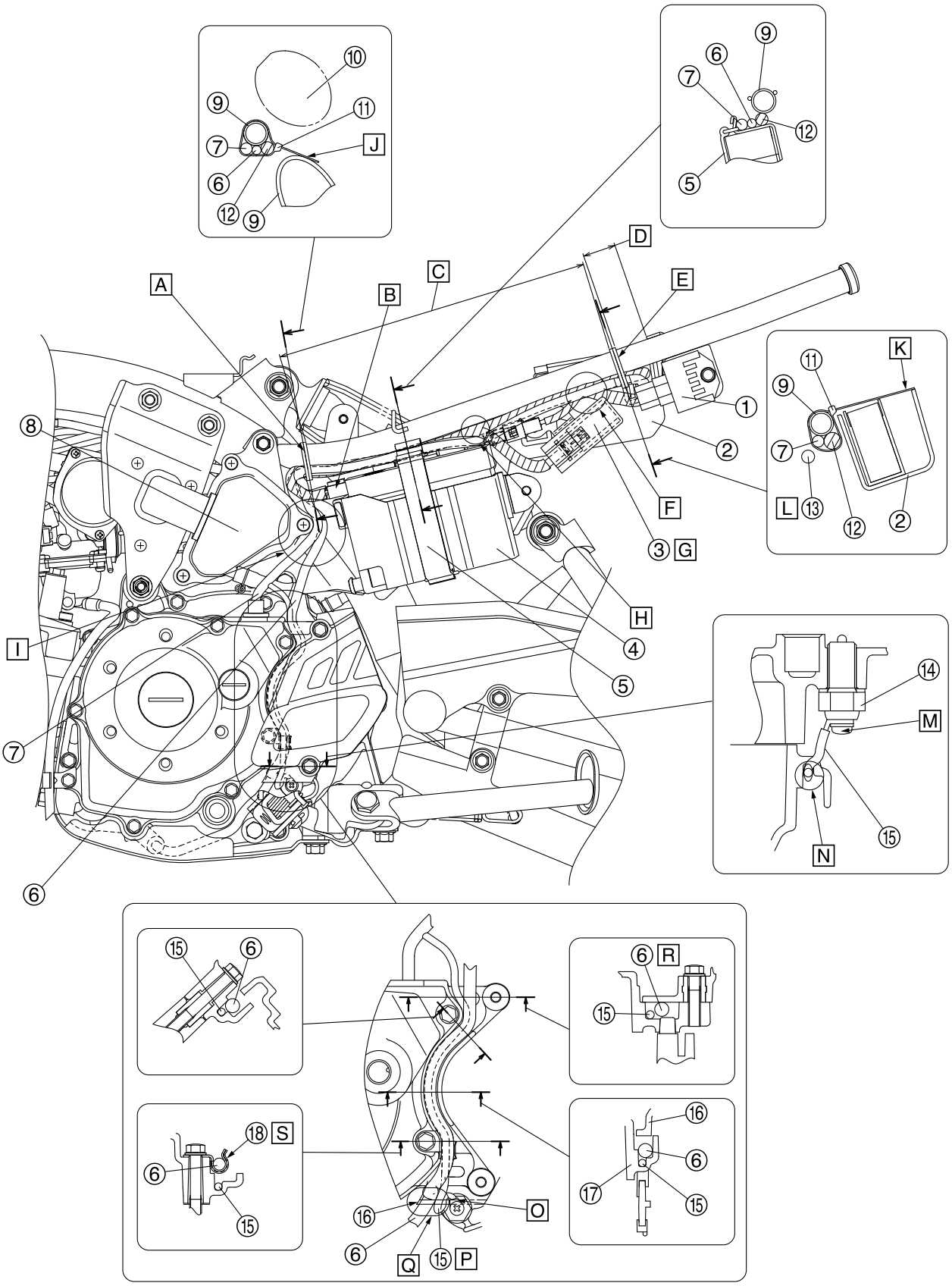
Front brake wire (left side view)



1. Throttle cable (decelerator cable)
2. Throttle cable (accelerator cable)
3. Main switch lead
4. Fuel tank breather hose
5. Thermo switch
6. Thermo switch lead
7. Ground lead terminal
8. Air filter case assembly
9. Fuel overflow hose
10. Fuel hose
11. Front fork guard
12. Cable guide
13. Brake cable
14. Engine guard
15. Starter motor
16. Starter motor lead
17. Fuel cock

A. Route the main switch lead over the handlebar.
B. Install the fuel tank breather hose to the frame (nozzle).
C. Make sure that there is no slack in the thermo switch lead in the area shown in the illustration.
D. Install the ground lead terminal with the crimped side facing to the right side of the vehicle using the bolt. Install the bolt from the right side of the vehicle.
E. Install the fuel hose to the fuel cock.
F. Route the brake cable through the guides on the front fork guard.
G. Route the throttle cable (accelerator cable) and throttle cable (decelerator cable) through the cable guide.
H. Cross the throttle cable (accelerator cable) and throttle cable (decelerator cable) at the steering head pipe.
I. Route the brake cable through the cable guide.
J. Installation procedure of the throttle cable.
K. Step 1: Route the throttle cable from under the frame through the cable guide.
L. Step 2: Route the throttle cable through the front side curved part of the cable guide.
M. Route the throttle cables through the cable guide so that the throttle cable (decelerator cable) is inside, and throttle cable (accelerator cable) is outside.

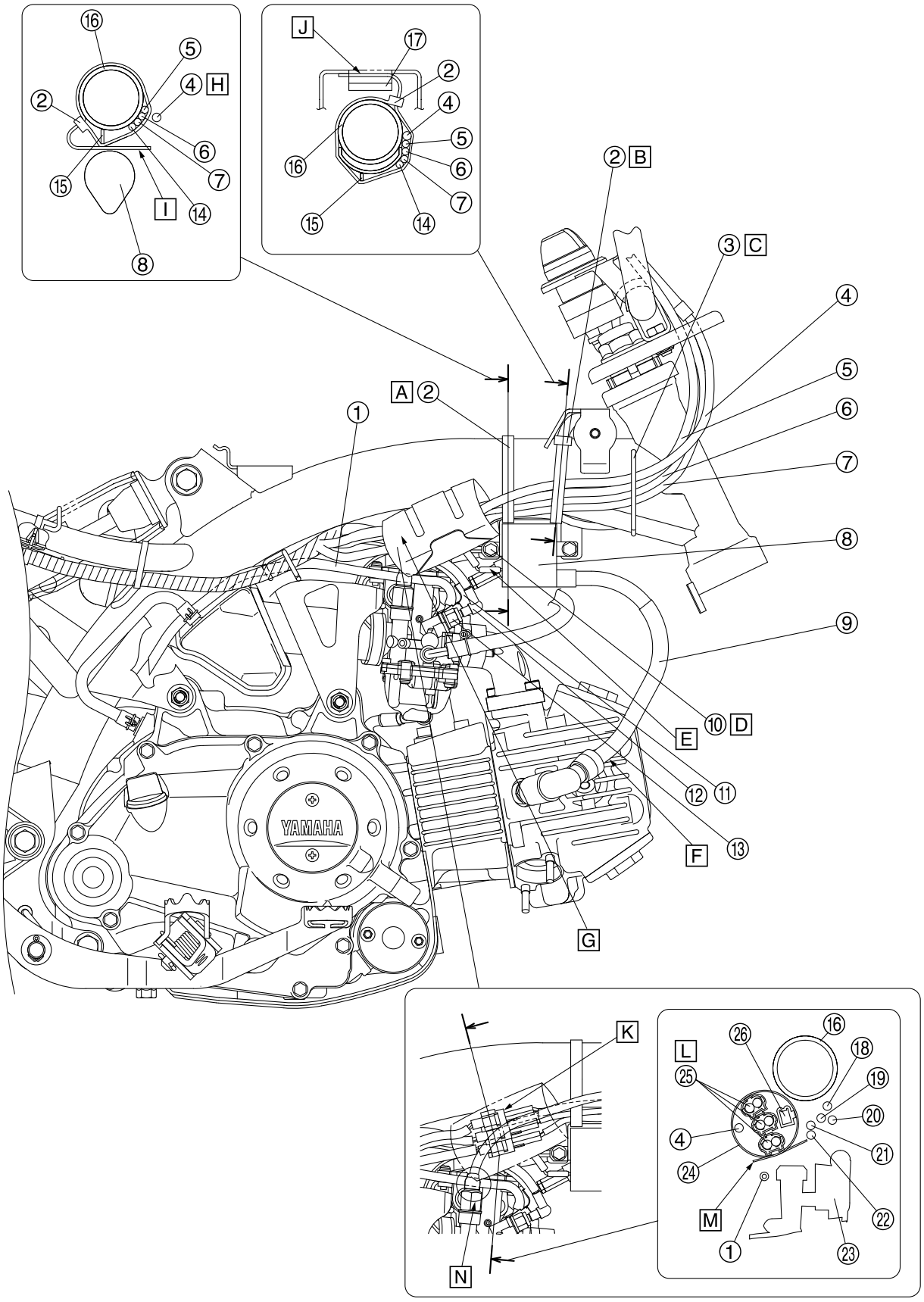
Battery (left side view)



1. Rectifier/regulator
2. Electrical components box
3. Starter relay
4. Battery
5. Battery band
6. Starter motor lead
7. Pickup coil/stator assembly lead
8. Air filter case assembly
9. Frame
10. Rear shock absorber
11. Plastic locking tie
12. Wire harness
13. Rectifier/regulator lead
14. Neutral switch
15. Neutral switch lead
16. Drive sprocket cover
17. AC magneto cover
18. Clamp

A. Fasten the wire harness, pickup coil/stator assembly lead, and starter motor lead to the frame with a plastic locking tie at the front end of the frame (seat rail).
Do not cut off the excess end of the plastic locking tie.
B. Install the battery so that the connected part of the coupler is facing toward front of the vehicle.
C. Make sure that there is no slack in the pickup coil/stator assembly lead and starter motor lead in the area shown in the illustration.
D. 20–30 mm (0.79–1.18 in)
E. Fasten the pickup coil/stator assembly lead and wire harness at the center of the white tape on the pickup coil/stator lead with a plastic locking tie.
Do not cut off the excess end of the plastic locking tie.
F. Install the wire harness so that the leads that branch off from the wire harness are routed downward.
G. Place the cover on the starter relay, install the starter relay assembly to the frame, and then connect the starter relay coupler.
H. Make sure that the leads that branch off from the wire harness are routed alongside the wire harness in the area shown in the illustration.
I. Gather the slack of the pickup coil/stator assembly lead and starter motor lead in the area shown in the illustration, and then place the slack between the air filter case and battery.
J. Face the buckle of the plastic locking tie inward with the end contacting the frame (main). Make sure that the plastic locking tie does not contact the shock absorber.
K. Face the buckle of the plastic locking tie inward with the end contacting the electrical components box.
L. Do not fasten the rectifier/regulator lead.
M. Install the neutral switch lead so that the AC magneto cover and neutral switch lead terminal does not contact each other.
N. Install the neutral switch lead to the AC magneto cover, and then install the starter motor lead. Make sure not pinch the starter motor lead when installing the drive sprocket cover.
O. Install the neutral switch lead terminal as shown in the illustration.
P. The neutral switch lead must be slacked as shown in the illustration.
Q. Route the neutral switch lead and starter motor lead side by side as shown in the illustration at the side panel of the drive sprocket cover.
R. Make sure not pinch the starter motor lead when installing the drive sprocket cover.
S. Fasten the starter motor with a clamp.

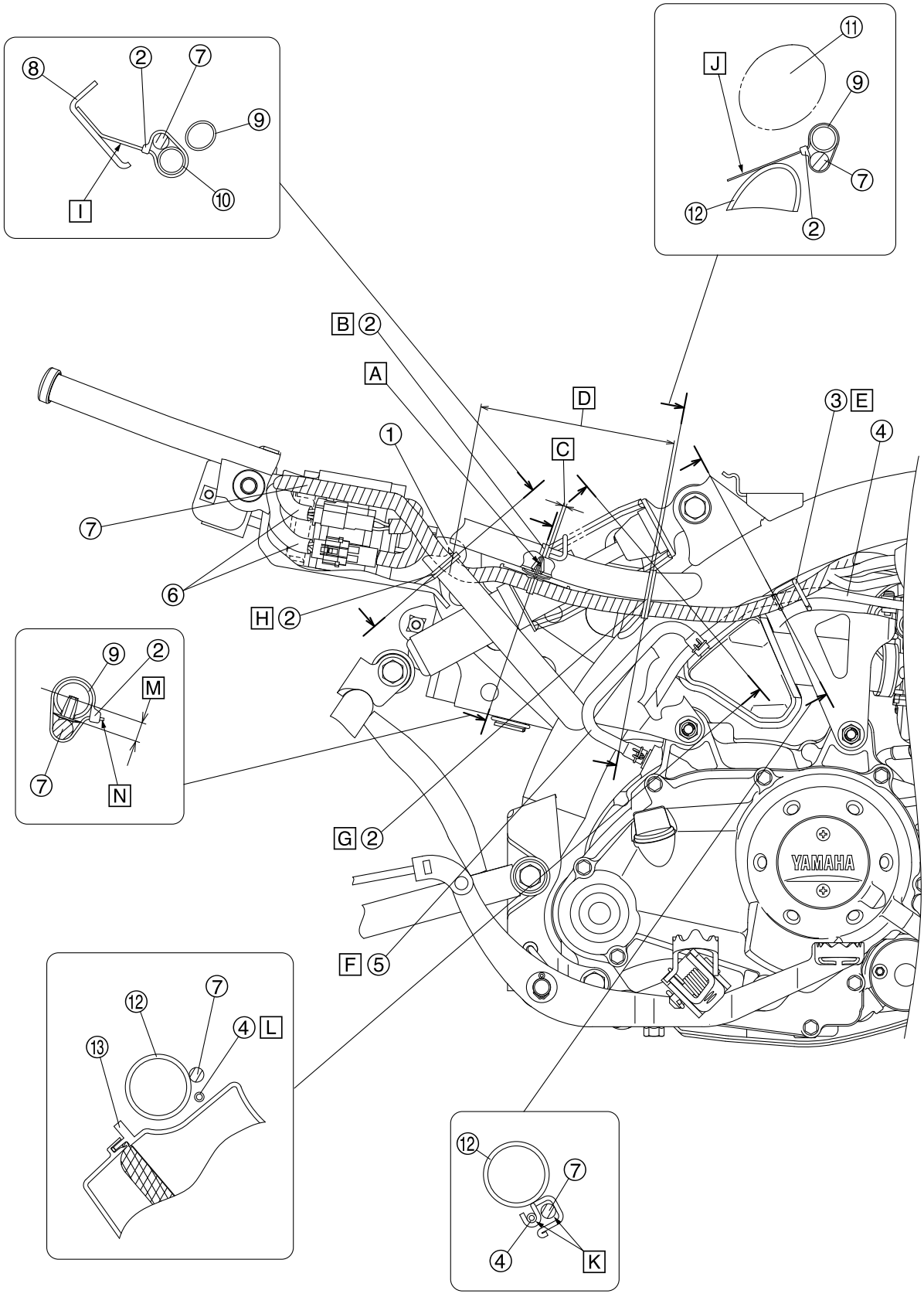
Ignition coil (right side view)



1. Carburetor air vent hose
2. Plastic locking tie
3. Cable guide
4. Starter cable
5. Engine stop switch lead
6. Start switch lead
7. Main switch lead
8. Ignition coil
9. Spark plug lead
10. Ignition coil ground lead (square shaped terminal)
11. Carburetor warmer lead flat terminal
12. Carburetor warmer lead L-shaped terminal
13. Carburetor warmer
14. Thermo switch lead
15. Frame (ignition coil bracket)
16. Frame
17. Frame (fuel tank bracket)
18. Ground lead
19. Ignition coil ground lead
20. Ignition coil lead
21. Carburetor warmer lead (flat terminal)
22. Carburetor warmer lead (L-shaped terminal)
23. Carburetor
24. Coupler cover
25. Start switch coupler/Main switch coupler/Engine stop switch coupler
26. Thermo switch coupler

A. Fasten the start switch lead, main switch lead, engine stop switch lead and thermo switch lead with a plastic locking tie at the back end of the frame (ignition coil bracket) as shown in the illustration.
B. Fasten the starter cable, start switch lead, main switch lead, engine stop switch lead and thermo switch lead with a plastic locking tie. Pass the plastic locking tie between the frame (fuel tank bracket) and frame, and fasten with the frame (ignition coil bracket).
C. Route the start switch lead, main switch lead, engine stop switch lead and starter cable through the cable guide.
D. Tighten the bolt to secure the ignition coil ground lead and ignition coil.
E. Connect the flat terminal to the ignition coil.
F. Contact the end of ignition coil lead protector to the spark plug cap when installing the ignition coil lead to the spark plug cap.
G. Connect the start switch coupler, main switch coupler, engine stop switch coupler, and thermo switch coupler, and then install them with the starter cable inside coupler cover.
H. Do not fasten the starter cable with a plastic locking tie.
I. Fasten the leads with a plastic locking tie, and place the end of the tie between the ignition coil and frame (ignition coil bracket).
J. Fasten the leads and cable with a plastic locking tie, and place the end of the tie inside frame (fuel tank bracket).
K. The couplers of identical colors should be connected.
L. The order of the coupler position is not required.
M. Place the coupler cover so that the slotted part is facing down.
N. Pass the carburetor air vent hose between the starter cable and carburetor.

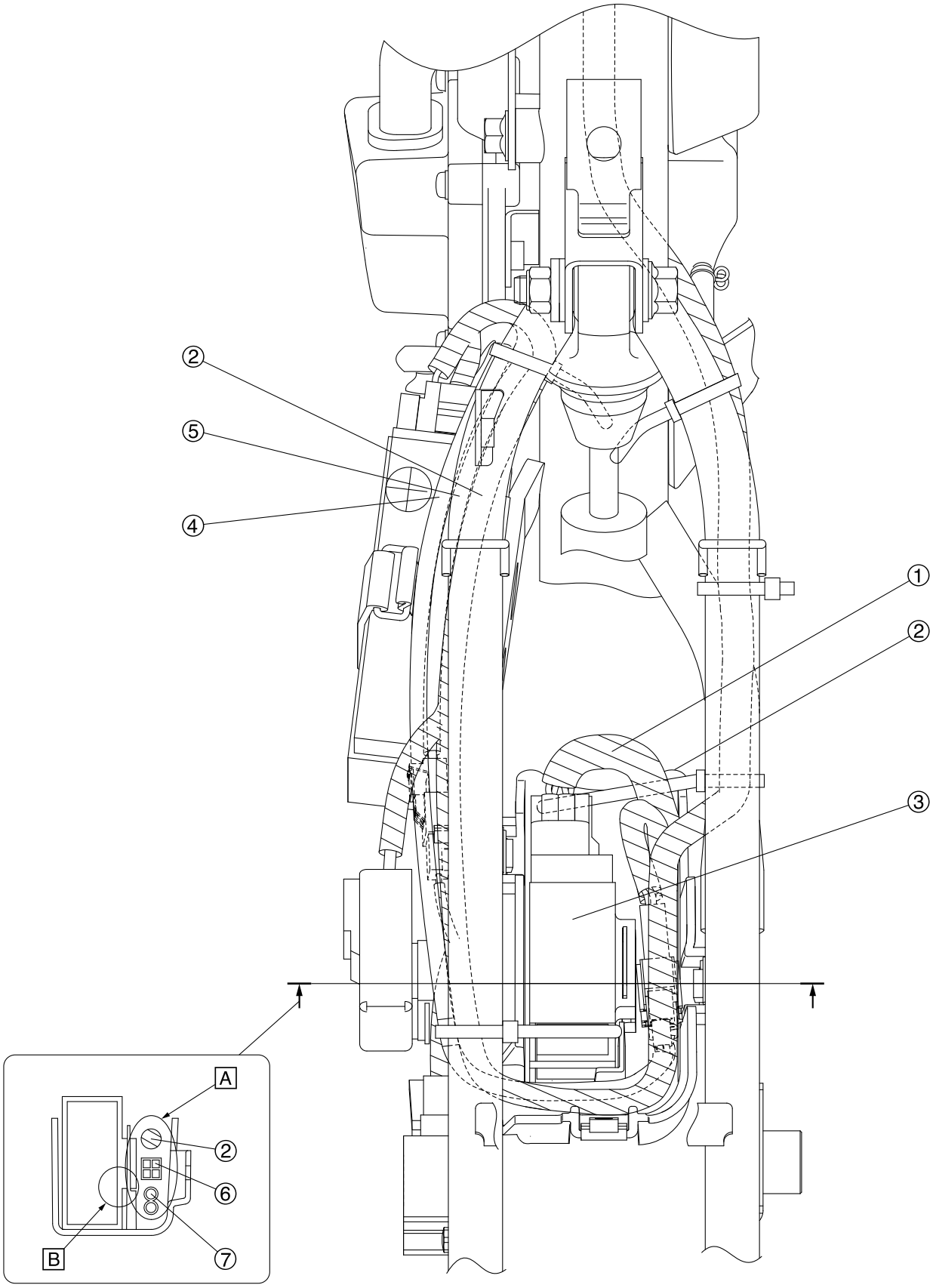
CDI unit (right side view)



1. CDI unit lead
2. Plastic locking tie
3. Cable guide
4. Carburetor air vent hose
5. Crankcase breather hose
6. Pickup coil/stator assembly lead
7. Wire harness
8. Electrical components box
9. Frame (seat rail)
10. Frame (back stay)
11. Shock absorber
12. Frame (main)
13. Air filter case assembly

A. Insert the wire harness holder completely into the hole in the frame.
B. Fasten the wire harness at the wire harness holder with a plastic locking tie. Cut off the excess end of the plastic locking tie.
C. Make sure that the plastic locking tie is not on the welded part.
D. Make sure that there is no slack in the wire harness in the area shown in the illustration.
E. Route the wire harness and carburetor air vent hose through the cable guide.
F. When installing the crankcase breather hose, make sure that it does not come in contact with the muffler or not twisted.
G. Fasten the wire harness to the frame at the front end of the frame (seat rail) with a plastic locking tie. Make sure that the plastic locking tie does not come in contact with the crankcase breather hose. Do not cut off the excess end of the plastic locking tie.
H. Fasten the wire harness with a plastic locking tie as far rearward as possible on the frame (back stay). Do not cut off the excess end of the plastic locking tie.
I. Face the buckle of the plastic locking tie inward, and place the end of the plastic locking tie inside of the electrical components box.
J. Face the buckle of the plastic locking tie inward with the end contacting the frame (main). Make sure that the plastic locking tie does not contact the shock absorber.
K. Route the wire harness through the guide, and then route the carburetor air vent hose through the guide.
L. Do not pinch the carburetor air vent hose between the air filter case assembly and frame (main).
M. Face the buckle of the plastic locking tie outward, and cut off the excess end of the plastic locking tie. Position the buckle of the plastic locking tie in the area shown in the illustration.
N. Cut off the excess end of the plastic locking tie. The plastic locking tie end should be 5 mm (0.20 in) or less.

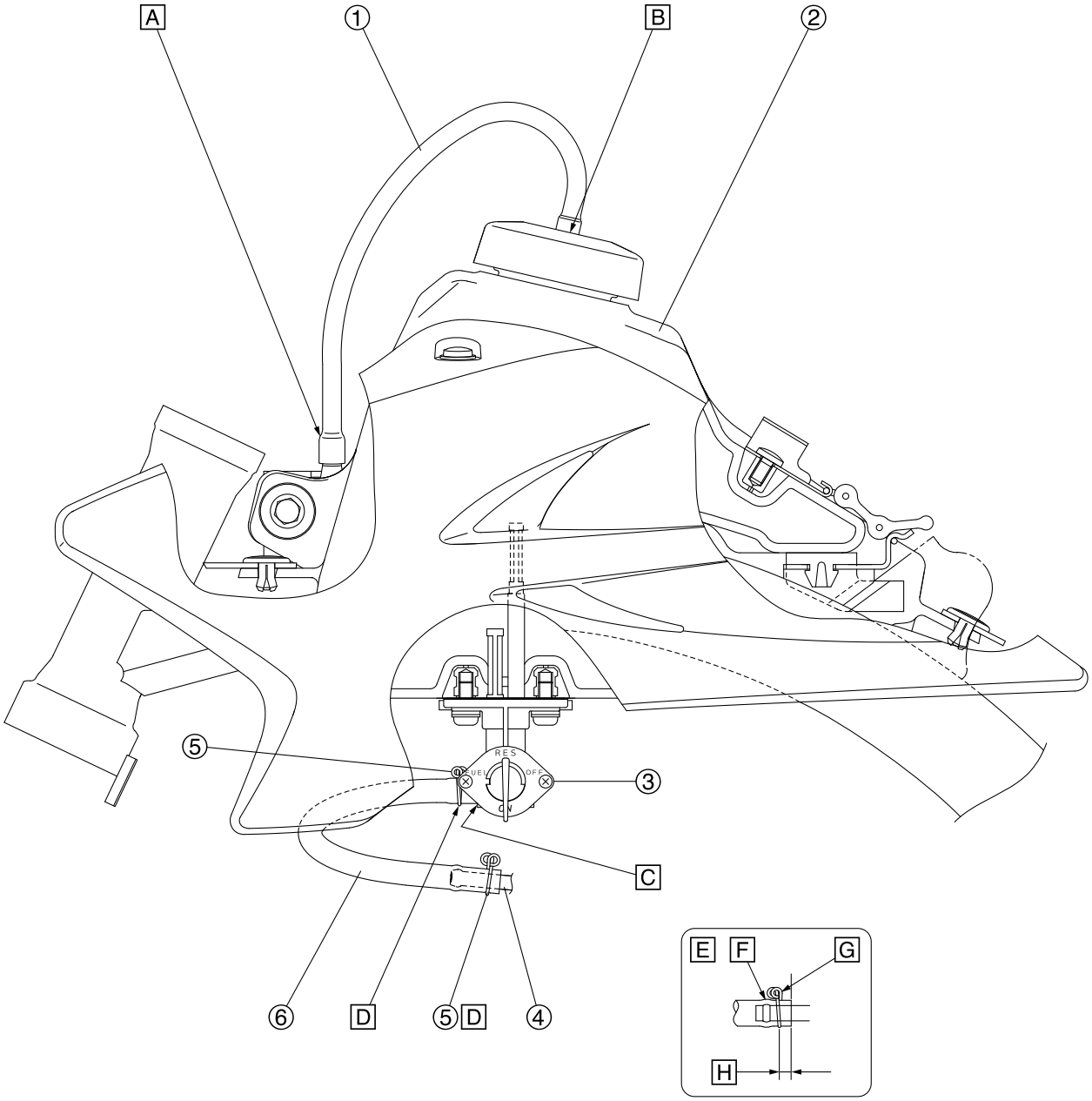
CDI unit (top view)



1. CDI unit lead
2. Wire harness
3. CDI unit
4. Pickup coil/stator assembly lead
5. Starter motor lead
6. Stator coil coupler
7. Pickup coil coupler

A. Before installing the CDI unit, connect the stator coil coupler and pickup coil coupler, and then place them under the wire harness in the electrical components box.
B. Place the cover on the CDI unit, and then install the CDI unit in the electrical components box.

Fuel tank (left side view)



1. Fuel tank breather hose
2. Fuel tank
3. Fuel cock
4. Carburetor
5. Hose clamp
6. Fuel hose

A. Install the wider side of the fuel tank breather hose onto the frame (nozzle). Make sure that the breather hose is not twisted.
B. Install the breather hose onto the fuel tank cap up to the base of the nozzle.
C. Install the fuel hose onto the fuel cock up to the base of nozzle.
D. Refer to the illustration of the hose clamp position. Point the end of the hose clamp upward.
E. Hose clamp position.
F. Raised area on the fuel hose.
G. Do not install the hose clamp on the raised area on the fuel hose.
H. Make sure that the hose clamp is installed about 5 mm (0.20 in) from the end of the fuel hose. (Same for the rest of the hose clamps)

PERIODIC CHECKS AND ADJUSTMENTS

EAS20451
PERIODIC MAINTENANCE

EAS20460
INTRODUCTION
This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAS1P6U305
PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM
TIP
- From 7000 km (4200 mi) or 18 months, repeat the maintenance intervals starting from 3000 km (1800 mi) or 6 months.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

No.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL	ODOMETER READINGS	
				1000 km (600 mi) or 1 month or 30 hours	3000 km (1800 mi) or 6 months or 90 hours	5000 km (3000 mi) or 12 months or 150 hours
1	*	Fuel line	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√
2		Spark plug	• Check condition. • Adjust gap and clean.		√	√
3	*	Valve clearance	• Check and adjust valve clearance when engine is cold.			√
4		Air filter element	• Clean with solvent. • Replace if necessary.		√	√
5	*	Crankcase breather system	• Check ventilation hose for cracks or damage and drain any deposits. • Replace if necessary.	√	√	√
6	*	Carburetor	• Check engine idling speed and starter operation. • Adjust if necessary.	√	√	√
7		Exhaust system	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√
8	*	Spark arrester	• Clean.			√
9		Engine oil	• Change (warm engine before draining).	√	√	√

EAS1P6U306
GENERAL MAINTENANCE AND LUBRICATION CHART
TIP
- From 7000 km (4200 mi) or 18 months, repeat the maintenance intervals starting from 3000 km (1800 mi) or 6 months.
- Items marked with an asterisk should be performed by a Yamaha dealer as they require special tools, data and technical skills.

No.		ITEM	CHECKS AND MAINTENANCE JOBS	INITIAL	ODOMETER READINGS	
				1000 km (600 mi) or 1 month or 30 hours	3000 km (1800 mi) or 6 months or 90 hours	5000 km (3000 mi) or 12 months or 150 hours
1	*	**Clutch**	• Check operation. • Adjust if necessary.	√	√	√
2	*	**Front brake**	• Check operation. • Adjust brake lever free play and replace brake shoes if necessary.	√	√	√
3	*	**Rear brake**	• Check operation. • Adjust brake pedal free play and replace brake shoes if necessary.	√	√	√
4	*	**Wheels**	• Check runout, spoke tightness and for damage. • Tighten spokes if necessary.	√	√	√
5	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√
6	*	**Wheel bearings**	• Check bearings for smooth operation. • Replace if necessary.		√	√
7	*	**Swingarm pivot bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease.		√	√
8		**Drive chain**	• Check chain slack/alignment and condition. • Adjust and lubricate chain with Yamaha chain and cable lube thoroughly.	Every ride		
9	*	**Steering bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease.	√		√
10	*	**Chassis fasteners**	• Check all chassis fitting and fasteners. • Correct if necessary.	√	√	√
11		**Brake lever pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√
12		**Brake pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√
13		**Sidestand pivot**	• Check operation. • Apply lithium-soap-based grease lightly.	√		√
14	*	**Front fork**	• Check operation and for grease leakage. • Replace if necessary.		√	√
15	*	**Shock absorber assembly**	• Check operation and for oil leakage. • Replace if necessary.			√
16	*	**Control cables**	• Apply Yamaha chain and cable lube or engine oil thoroughly.	√	√	√
17	*	**Throttle grip**	• Check operation. • Check the throttle grip free play, and adjust if necessary. • Lubricate the cable and grip housing.	√	√	√

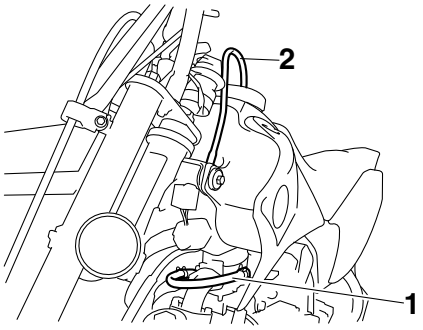
EAS1P6U307

TIP

The air filter needs more frequent service if you are riding in unusually wet or dusty areas.

EAS21030
CHECKING THE FUEL LINE
1. Check:
   • Fuel hose “1”
   • Fuel tank breather hose “2”
   Cracks/damage → Replace.
   Loose connection → Connect properly.

ECA14940
NOTICE
Make sure the fuel tank breather hose is routed correctly.



EAS20690
CHECKING THE SPARK PLUG
1. Disconnect:
   • Spark plug cap
2. Remove:
   • Spark plug

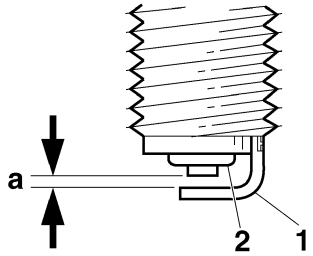
ECA13330
NOTICE
Before removing the spark plug, blow away any dirt accumulated in the spark plug well with compressed air to prevent it from falling into the cylinder.

3. Check:
   • Spark plug type
   Incorrect → Change.

	Manufacturer/model **NGK/CR7HSA**

4. Check:
   • Electrode “1”
   Damage/wear → Replace the spark plug.
   • Insulator “2”
   Abnormal color → Replace the spark plug.
   Normal color is medium-to-light tan.
5. Clean:
   • Spark plug
   (with a spark plug cleaner or wire brush)
6. Measure:
   • Spark plug gap “a”
   (with a wire thickness gauge)
   Out of specification → Regap.

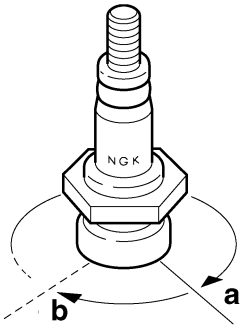
	Spark plug gap **0.6–0.7 mm (0.024–0.028 in)**



7. Install:
   • Spark plug

	Spark plug **13 Nm (1.3 m·kg, 9.4 ft·lb)**

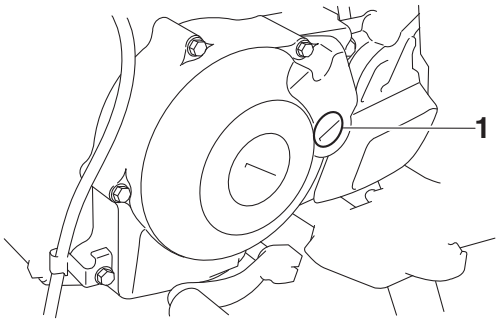
TIP
- Before installing the spark plug, clean the spark plug and gasket surface.
- Finger tighten “a” the spark plug before torquing to specification “b”.



8. Connect:
   • Spark plug cap

EAS20700
CHECKING THE IGNITION TIMING
TIP
Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure all connections are tight and free of corrosion.

1. Remove:
   • Timing mark accessing screw “1”



2. Connect:
   • Timing light
   • Digital tachometer
   (onto the spark plug lead)

Timing light
90890-03141
YU-03141
Digital tachometer
90890-06760
YU-39951-B

3. Check:
   • Ignition timing

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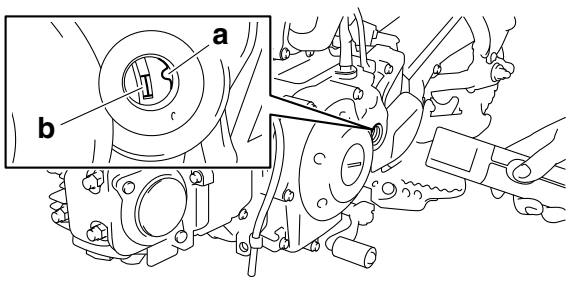
a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

Engine idling speed
1600–1800 r/min

b. Check that the stationary pointer "a" on the AC magneto cover is within the firing range "b" on the AC magneto rotor.
   Incorrect firing range → Check the ignition system.

TIP
The ignition timing is not adjustable.



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4. Disconnect:
   • Digital tachometer
   • Timing light

5. Install:
   • Timing mark accessing screw
   (along with the O-ring New)

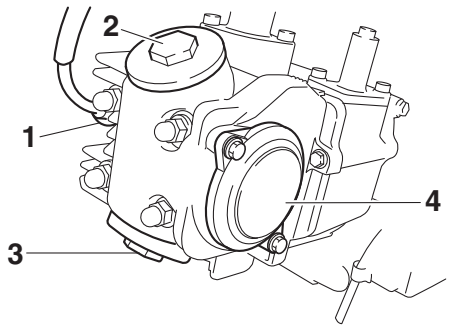
EAS20520

ADJUSTING THE VALVE CLEARANCE

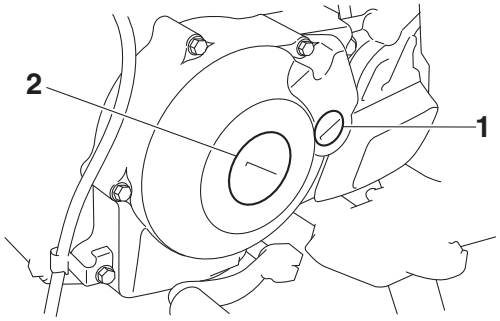
The following procedure applies to all of the valves.

TIP
- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
   • Spark plug cap "1"
   • Spark plug
   • Intake tappet cover "2"
   • Exhaust tappet cover "3"
   • Camshaft sprocket cover "4"



2. Remove:
   • Timing mark accessing screw "1"
   • Crankshaft end cover "2"
   • O-rings



3. Measure:
   • Valve clearance
   Out of specification → Adjust.

Valve clearance (cold)
Intake
0.05–0.09 mm (0.0020–0.0035 in)
Exhaust
0.08–0.12 mm (0.0032–0.0047 in)

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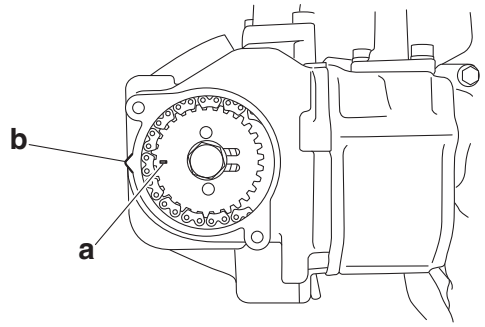
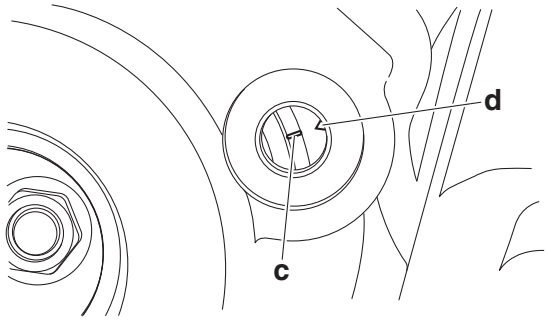
a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark "a" on the camshaft sprocket with the stationary pointer "b" on the cylinder head.

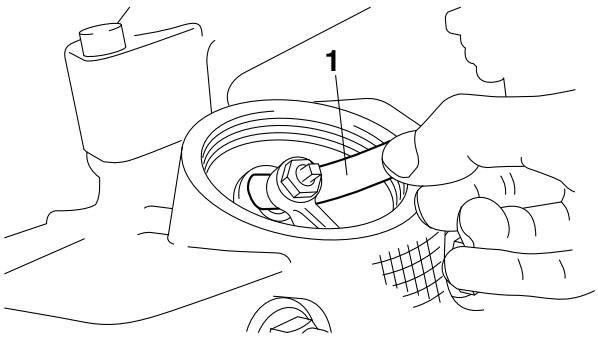


c. Align the "I" mark "c" on the rotor with the stationary pointer "d" on the AC magneto cover.



d. Measure the valve clearance with a thickness gauge "1".
Out of specification → Adjust.

Thickness gauge
90890-03079
Narrow gauge set
YM-34483



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4. Adjust:
• Valve clearance

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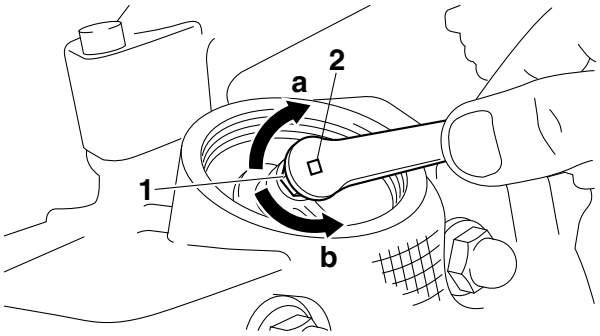
a. Loosen the locknut "1".
b. Insert a thickness gauge between the end of the adjusting screw and the valve tip.
c. Turn the adjusting screw "2" in direction "a" or "b" until the specified valve clearance is obtained.



Direction "a"
Valve clearance is decreased.
Direction "b"
Valve clearance is increased.

Tappet adjusting tool
90890-01311
Six piece tappet set
YM-A5970

TIP
Hold the adjusting screw to prevent it from moving and tighten the locknut to specification.

Locknut
7 Nm (0.7 m·kg, 5.1 ft·lb)

d. Measure the valve clearance again.
e. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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5. Install:
• Crankshaft end cover
(along with the O-ring New)
• Timing mark accessing screw
(along with the O-ring New)

TIP
Apply engine oil on the O-rings.

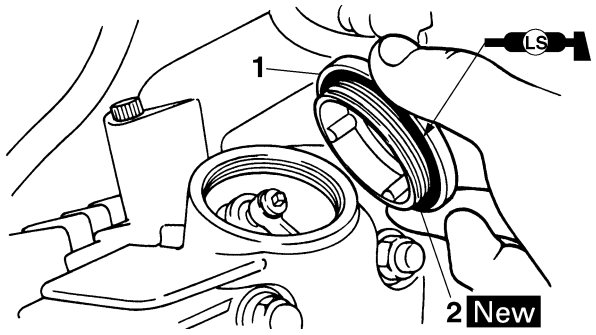
Crankshaft end cover
5 Nm (0.5 m·kg, 3.6 ft·lb)
Timing mark accessing screw
5 Nm (0.5 m·kg, 3.6 ft·lb)

6. Install:
   - Camshaft sprocket cover (along with the O-ring New)
   - Exhaust tappet cover (along with the O-ring New)
   - Intake tappet cover "1" (along with the O-ring "2" New)
   - Spark plug
   - Spark plug cap

TIP

Apply lithium-soap-based grease on the O-rings.

Camshaft sprocket cover bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)
Exhaust tappet cover
18 Nm (1.8 m·kg, 13 ft·lb)
Intake tappet cover
18 Nm (1.8 m·kg, 13 ft·lb)
Spark plug
13 Nm (1.3 m·kg, 9.4 ft·lb)

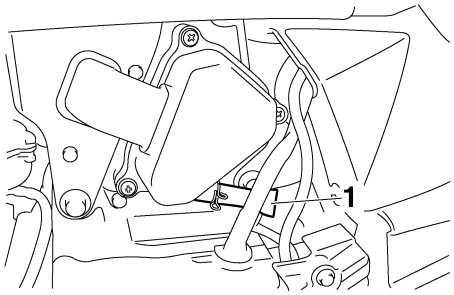


EAS20951

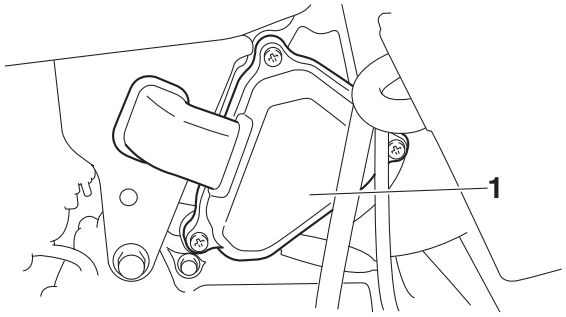
CLEANING THE AIR FILTER ELEMENT

TIP

On the bottom of the air filter case is a check hose "1". If dust or water or both collects in this hose, clean the air filter element and air filter case.



1. Remove:
   - Air filter case cover "1"
   - Air filter element
   - Air filter mesh



2. Clean:
   - Air filter element
   - Air filter mesh (with solvent)

EWA13020

WARNING

Never use low flash point solvents, such as gasoline, to clean the air filter element. Such solvents may cause a fire or an explosion.

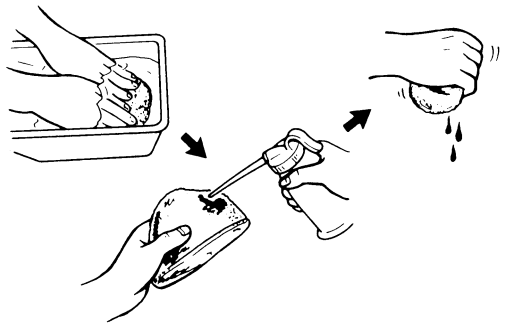
TIP

After cleaning, gently squeeze the air filter element to remove the excess solvent.

ECA13430

NOTICE

Do not twist the air filter element when squeezing it.



3. Check:
   - Air filter element
     Damage → Replace.
4. Apply the recommended oil to the entire surface of the air filter element and squeeze out the excess oil. The air filter element should be wet but not dripping.

Air filter oil grade
Yamaha foam air filter oil or other quality foam air filter oil

5. Install:
   - Air filter mesh
   - Air filter element
   - Air filter case cover

(along with the gasket)

ECA1P6U314

NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect the carburetor tuning, leading to poor engine performance and possible overheating.

TIP

When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

EAS21070

CHECKING THE CRANKCASE BREATHER HOSE

1. Check:
   - Crankcase breather hose
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA13450

NOTICE

Make sure the crankcase breather hose is routed correctly.

EAS20610

ADJUSTING THE ENGINE IDLING SPEED

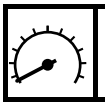
TIP

Prior to adjusting the engine idling speed, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Install:
   - Digital tachometer
     (onto the spark plug lead)

Digital tachometer
90890-06760
YU-39951-B

3. Check:
   - Engine idling speed
     Out of specification → Adjust.



Engine idling speed
1600–1800 r/min

4. Adjust:
   - Engine idling speed

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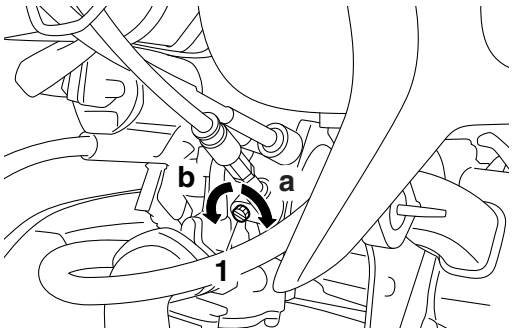
a. Turn the throttle stop screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

Direction "a"
Engine idling speed is increased.
Direction "b"
Engine idling speed is decreased.



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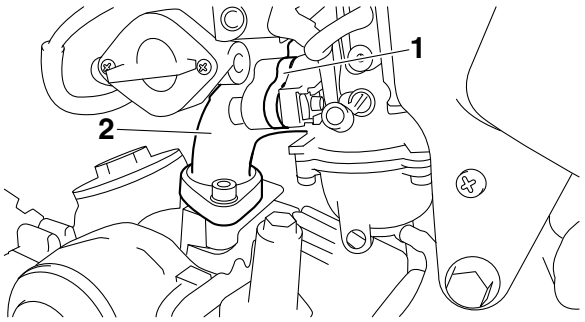
5. Adjust:
   - Throttle grip free play
     Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-18.

Throttle grip free play
3.0–5.0 mm (0.12–0.20 in)

EAS20990

CHECKING THE CARBURETOR JOINT AND INTAKE MANIFOLD

1. Check:
   - Carburetor joint "1"
   - Intake manifold "2"
     Cracks/damage → Replace.
     Refer to "CARBURETOR" on page 6-3.



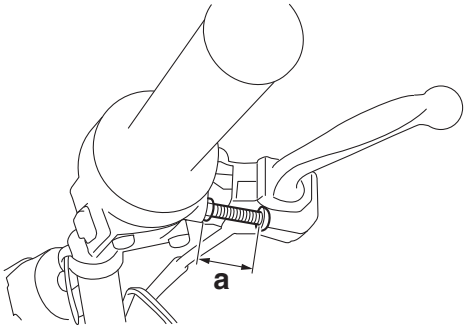
EAS1P6U308

ADJUSTING THE SPEED LIMITER

The speed limiter keeps the carburetor throttle from becoming fully opened even when the throttle grip is applied to the maximum position. Screwing in the adjusting screw stops the engine speed from increasing.

1. Measure:
   • Speed limiter length “a”
   Out of specification → Adjust.

Speed limiter length
Less than 28 mm (1.10 in)



2. Adjust:
   • Speed limiter length

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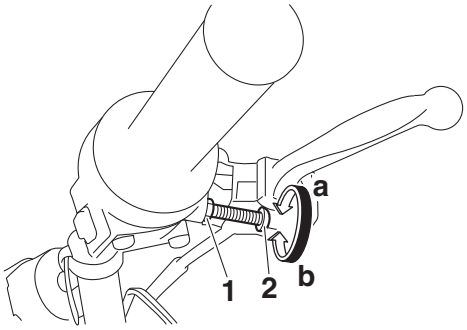
a. Loosen the locknut “1”.
b. Turn the adjusting screw “2” in direction “a” or “b” until the specified speed limiter length is obtained.

Direction “a”
Speed limiter length is decreased.
Direction “b”
Speed limiter length is increased.



c. Tighten the locknut.

EWA1P6U308

⚠ WARNING

• Particularly for a beginner rider, the speed limiter should be screwed in completely. Screw it out little by little as their riding technique improves. Never remove the speed limiter for a beginner rider.
• For proper throttle cable operation do not turn out the adjusting screw more than 25 mm (0.98 in). Also, always adjust the throttle grip free play to 3–5 mm (0.12–0.20 in).

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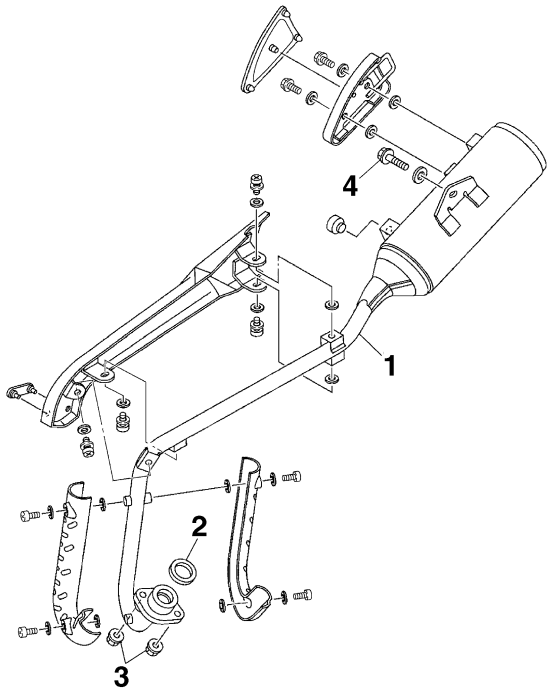
EAS21081

CHECKING THE EXHAUST SYSTEM

1. Remove:
   • Seat assembly
   Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   • Muffler “1”
   Cracks/damage → Replace.
   • Gasket “2”
   Exhaust gas leaks → Replace the gasket.
3. Check:
   • Tightening torque

Exhaust pipe nut “3”
7 Nm (0.7 m·kg, 5.1 ft·lb)
Muffler bolt “4”
38 Nm (3.8 m·kg, 27 ft·lb)



4. Install:
   • Seat assembly
   Refer to “GENERAL CHASSIS” on page 4-1.

EAS1P6U309

CLEANING THE SPARK ARRESTER

1. Clean:
   • Spark arrester

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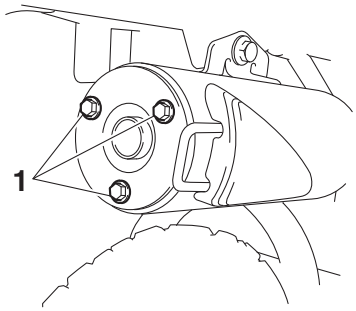
EWA1P6U309

⚠ WARNING

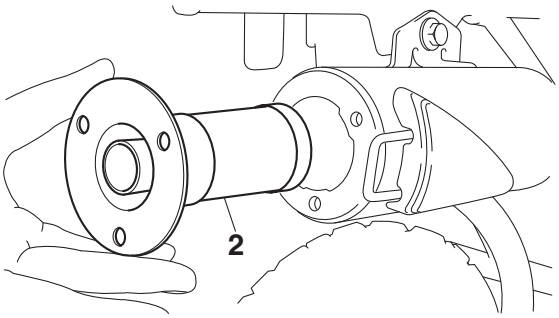
• Select a well-ventilated area free of combustible materials.
• Always let the exhaust system cool before performing this operation.
• Do not start the engine when removing the

tailpipe from the muffler.
• Make sure that the transmission is in neutral.

a. Remove the tailpipe bolts “1”.



b. Remove the tailpipe “2” by pulling it out of the muffler.



c. Tap the tailpipe lightly with a soft-face hammer or suitable tool, then use a wire brush to remove any carbon deposits from the spark arrester portion of the tailpipe and inside of the tail pipe housing.
d. Insert the tailpipe into the muffler and align the bolt holes.
e. Insert the tailpipe bolts and tighten them.

Tailpipe bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

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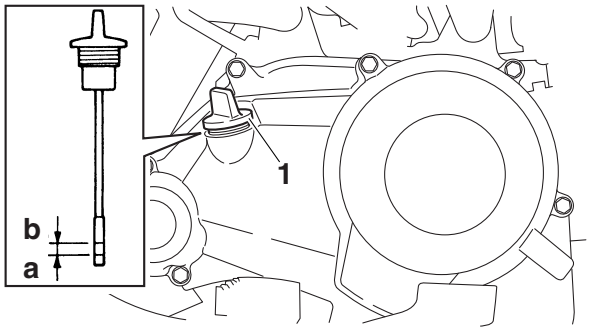
EAS20741
CHECKING THE ENGINE OIL LEVEL

1. Stand the vehicle on a level surface.

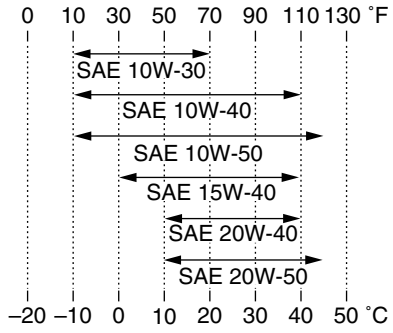
TIP
• Place the vehicle on a suitable stand.
• Make sure the vehicle is upright.

2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   • Oil filler cap “1”
   (along the O-ring)
4. Check:
   • Engine oil level
   The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
   Below the minimum level mark → Add the recommended engine oil to the proper level.

TIP
• Before checking the engine oil level, wait a few minutes until the oil has settled.
• Do not screw the oil filler cap in when checking the oil level.



Recommended brand
YAMALUBE
Type
SAE 10W-30, 10W-40, 10W-50, 15W-40, 20W-40 or 20W-50
Recommended engine oil grade
API service SG type or higher, JASO standard MA



ECA1P6U313
NOTICE
• Engine oil also lubricates the clutch, and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a grade of CD or higher and do not use oils labeled “ENERGY CONSERVING II”.
• Do not allow foreign materials to enter the crankcase.

5. Start the engine, warm it up for several minutes, and then turn it off.
6. Check the engine oil level again.

TIP

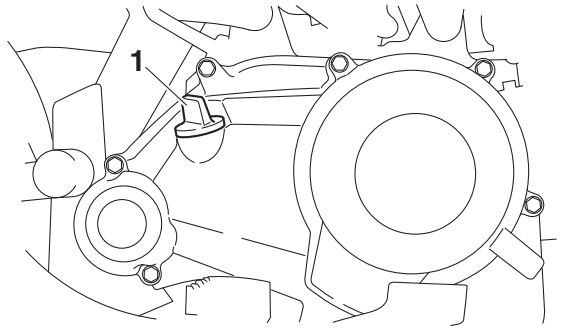
- Before checking the engine oil level, wait a few minutes until the oil has settled.
- Do not screw the oil filler cap in when checking the oil level.

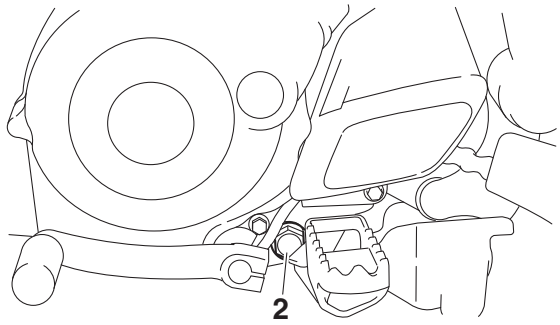
7. Install:
   - Oil filler cap
     (along with the O-ring New)

EAS20801

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   - Oil filler cap "1"
     (along with the O-ring)
   - Engine oil drain bolt "2"
     (along with the gasket)





4. Drain:
   - Engine oil
     (completely from the crankcase)
5. Install:
   - Engine oil drain bolt
     (along with the gasket New)

	Engine oil drain bolt **20 Nm (2.0 m·kg, 14 ft·lb)**

6. Fill:
   - Crankcase
     (with the specified amount of the recommended engine oil)

	Engine oil quantity **Total amount** **1.00 L (1.06 US qt, 0.88 Imp.qt)** **Periodic oil change** **0.80 L (0.85 US qt, 0.70 Imp.qt)**

7. Install:
   - Oil filler cap
     (along with the O-ring New)
8. Start the engine, warm it up for several minutes, and then turn it off.
9. Check:
   - Engine
     (for engine oil leaks)
10. Check:
    - Engine oil level
      Refer to "CHECKING THE ENGINE OIL LEVEL" on page 3-9.

EAS1P6U312

ADJUSTING THE CLUTCH RELEASE SYSTEM

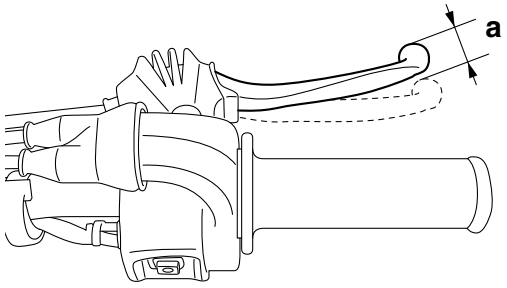
1. Remove:
   - Clutch adjuster cover
     Refer to "CLUTCH" on page 5-37.
2. Adjust:
   - Clutch release system
     Refer to "INSTALLING THE CLUTCH" on page 5-40.
3. Install:
   - Clutch adjuster cover
     Refer to "CLUTCH" on page 5-37.

EAS21181

ADJUSTING THE FRONT DRUM BRAKE

1. Check:
   - Front brake lever free play "a"
     Out of specification → Adjust.

	Front brake lever free play **10.0–20.0 mm (0.39–0.79 in)**



2. Adjust:
   • Brake lever free play

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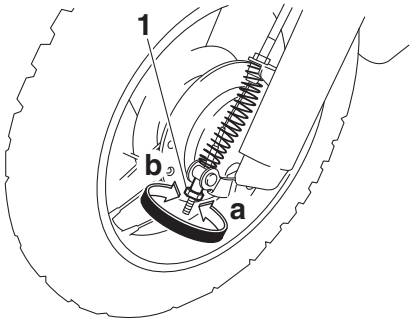
a. Turn the adjusting nut "1" in direction "a" or "b" until the specified brake lever free play is obtained.

Direction "a"
Brake lever free play is decreased.
Direction "b"
Brake lever free play is increased.



ECA15730

NOTICE

After adjusting the brake lever free play, make sure there is no brake drag.

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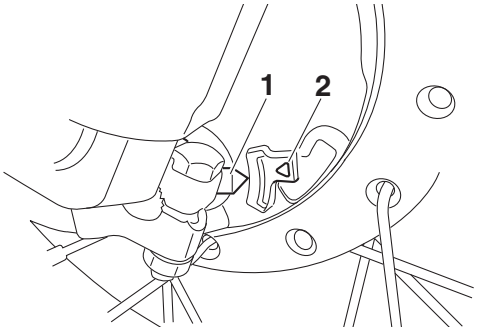
EAS21300

CHECKING THE FRONT BRAKE SHOES

1. Operate the brake.
2. Check:
   • Brake shoe wear indicator "1"
   Reaches the wear limit line "2" → Replace the brake shoes as a set.
   Refer to "FRONT BRAKE" on page 4-9.

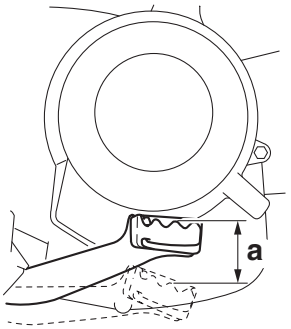


EAS21220

ADJUSTING THE REAR DRUM BRAKE

1. Check:
   • Brake pedal free play "a"
   Out of specification → Adjust.

Brake pedal free play
10.0–20.0 mm (0.39–0.79 in)



2. Adjust:
   • Brake pedal free play

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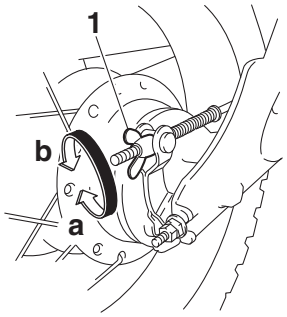
a. Turn the rear brake pedal adjusting nut "1" in direction "a" or "b" until the specified brake pedal free play is obtained.

Direction "a"
Brake pedal free play is decreased.
Direction "b"
Brake pedal free play is increased.

ECA13520

NOTICE

After adjusting the brake pedal position and free play, make sure there is no brake drag.



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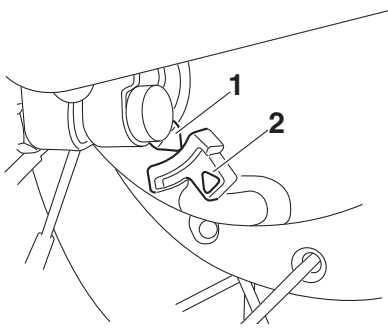
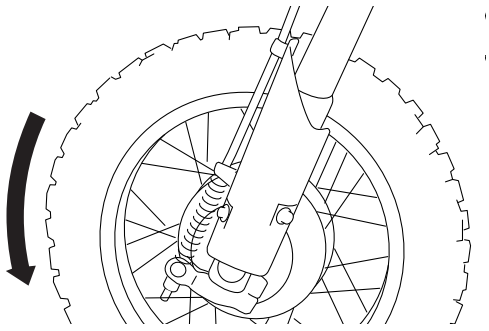
EAS21310
CHECKING THE REAR BRAKE SHOES
1. Operate the brake.
2. Check:
   • Brake shoe wear indicator "1"
   Reaches the wear limit line "2" → Replace the brake shoes as a set.
   Refer to "REAR BRAKE" on page 4-12.

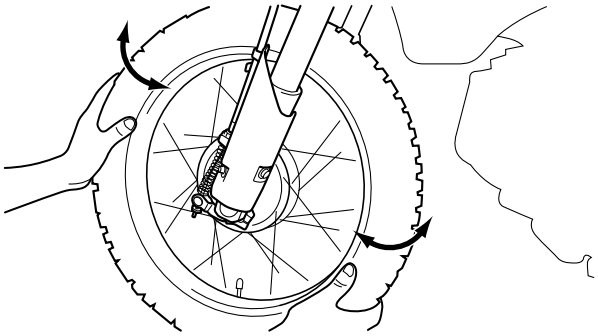


EAS21670
CHECKING THE WHEELS
The following procedure applies to both of the wheels.
1. Check:
   • Wheel runout
   Damage/abnormal runout → Replace.

TIP
Elevate the wheel and turn it.



2. Check:
   • Bearing free play
   Free play → Replace.

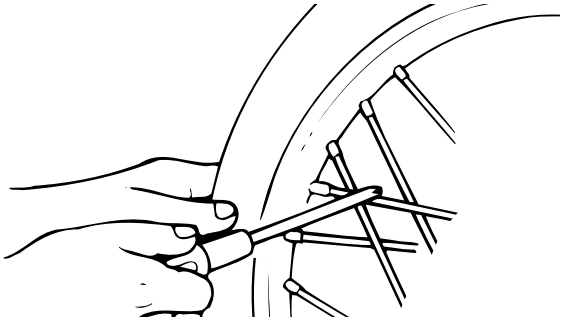


EWA1P6U311
⚠ WARNING
Never attempt to make any repairs to a wheel.

TIP
After a tire or wheel has been changed or replaced, always balance the wheel.

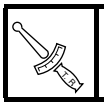
EAS21681
CHECKING AND TIGHTENING THE SPOKES
The following procedure applies to all of the spokes.
1. Check:
   • Spoke
   Bends/damage → Replace.
   Loose → Tighten.
   Tap the spoke with a screwdriver.

TIP
A tight spoke will emit a clear, ringing tone; a loose spoke will sound flat.

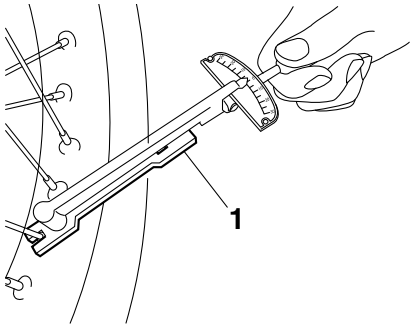


2. Tighten:
   • Spoke
   (with a spoke nipple wrench "1")

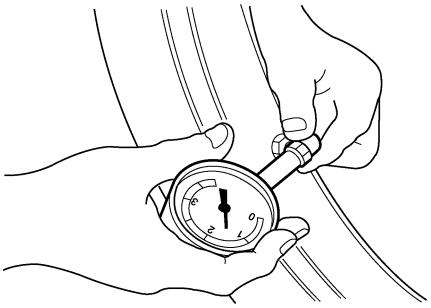
	**Spoke nipple wrench (10–11)** **90890-01523** **YM-01523**

	**Spoke** **2 Nm (0.2 m·kg, 1.4 ft·lb)**

TIP
Be sure to tighten the spokes before and after break-in.



EAS21650
CHECKING THE TIRES
The following procedure applies to both of the tires.
1. Check:
   • Tire air pressure
   Out of specification → Regulate.



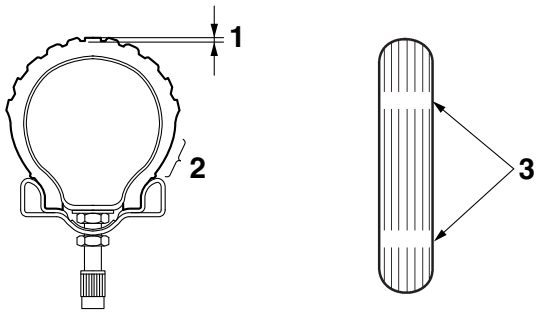
EWA1P6U310
⚠ WARNING
- **The tire air pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.**
- **The tire air pressure and the suspension must be adjusted according to the total weight (including the rider) and the anticipated riding speed.**
- **Operation of an overloaded vehicle could cause tire damage, an accident or an injury.**

NEVER OVERLOAD THE VEHICLE.

Tire air pressure (measured on cold tires)
Front
100 kPa (1.00 kgf/cm^2, 15 psi)
Rear
100 kPa (1.00 kgf/cm^2, 15 psi)

EWA13190
⚠ WARNING
It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

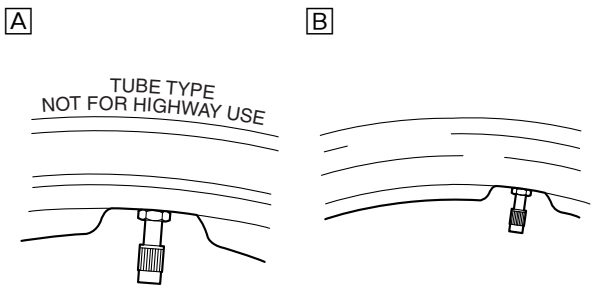
2. Check:
   • Tire surfaces
   Damage/wear → Replace the tire.



1. Tire tread depth
2. Side wall
3. Wear indicator

Wear limit (front)
4.0 mm (0.16 in)
Wear limit (rear)
4.0 mm (0.16 in)

EWA14080
⚠ WARNING
- **Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.**
- **When using a tube tire, be sure to install the correct tube.**
- **Always replace a new tube tire and a new tube as a set.**
- **To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.**
- **Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.**



A. Tire
B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

⚠ WARNING

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.

Front tire
Size
2.50-10 4PR
Manufacturer/model
CHENG SHIN/C183A

Rear tire
Size
2.50-10 4PR
Manufacturer/model
CHENG SHIN/C183A

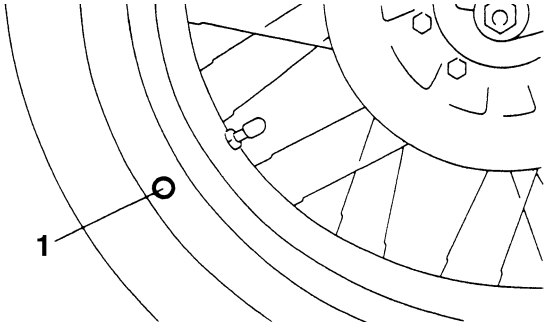
EWA13210

⚠ WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

TIP

Align the mark "1" with the valve installation point.



EAS1P6U313

CHECKING THE WHEEL BEARINGS

The following procedure applies to all of the wheel bearings.

1. Check:
   - Wheel bearings
     Refer to "REMOVING THE FRONT WHEEL" on page 4-3 and "REMOVING THE REAR WHEEL (DRUM)" on page 4-7.

EAS1P6U314

CHECKING THE SWINGARM PIVOT

1. Measure:
   - Swingarm side play
   - Swingarm vertical movement
     Refer to "REMOVING THE SWINGARM" on page 4-26.
2. Check:
   - Spacer
   - Bushings
     Refer to "REMOVING THE SWINGARM" on page 4-26.

EAS1P6U315

LUBRICATING THE SWINGARM PIVOT

1. Lubricate:
   - Pivot shaft

Recommended lubricant
Lithium-soap-based grease

Refer to "INSTALLING THE SWINGARM" on page 4-26.

EAS21390

ADJUSTING THE DRIVE CHAIN SLACK

TIP

The drive chain slack must be checked at the tightest point on the chain.

ECA13550

NOTICE

A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep

the drive chain slack within the specified limits.

1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

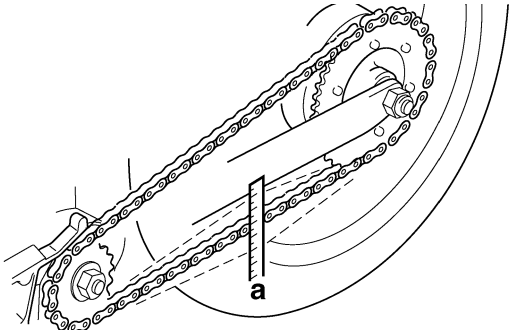
Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Move the rear wheel several times and find the tightest position of drive chain.
3. Check:
   - Drive chain slack "a"
     Out of specification → Adjust.

	Drive chain slack **35.0–45.0 mm (1.38–1.77 in)**



TIP

Measure the drive chain slack halfway between the drive axle and rear wheel axle.

4. Adjust:
   - Drive chain slack

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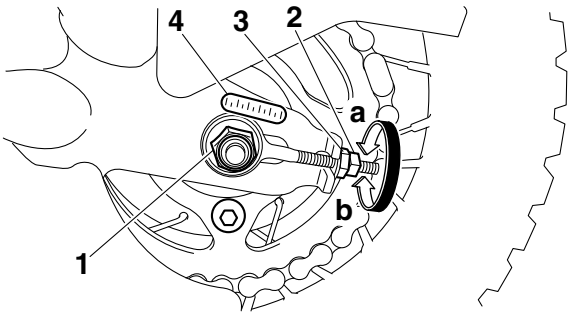
a. Loosen the rear wheel axle nut "1".
b. Loosen both locknuts "2".
c. Turn both adjusting nuts "3" in direction "a" or "b" until the specified drive chain slack is obtained.

Direction "a"
Drive chain is tightened.
Direction "b"
Drive chain is loosened.



TIP

- Using the alignment marks "4" on each side of the swingarm, make sure that both drive chain pullers are in the same position for proper wheel alignment.
- Push the rear wheel forward to make sure there is no clearance between the swingarm end plates and the ends of the swingarm.

d. Tighten the rear wheel axle nut to specification.

	Rear wheel axle nut **60 Nm (6.0 m·kg, 43 ft·lb)**

e. Tighten the locknuts to specification.

	Locknut **7 Nm (0.7 m·kg, 5.1 ft·lb)**

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EAS21450

LUBRICATING THE DRIVE CHAIN

The drive chain consists of many interacting parts. If the drive chain is not maintained properly, it will wear out quickly. Therefore, the drive chain should be serviced, especially when the vehicle is used in dusty areas.
Use only kerosene to clean the drive chain. Wipe the drive chain dry and thoroughly lubricate it with engine oil or chain lubricant that is suitable for non-O-ring chains.

	Recommended lubricant **Engine oil or chain lubricant suitable for non-O-ring chains**

EAS21510

CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120

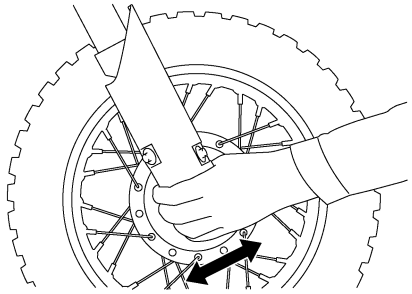
⚠ WARNING

Securely support the vehicle so that there is

no danger of it falling over.

TIP
Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:
   • Steering head
   Grasp the bottom of the front fork legs and gently rock the front fork.
   Binding/looseness → Adjust the steering head.



3. Remove:
   • Upper bracket
   Refer to "STEERING HEAD" on page 4-19.
4. Adjust:
   • Steering head

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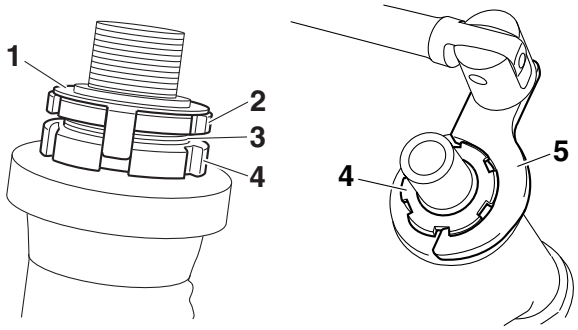
a. Remove the lock washer "1", the upper ring nut "2", and the rubber washer "3".
b. Loosen the lower ring nut "4" with the steering nut wrench "5".

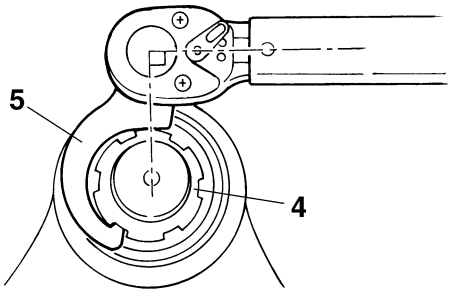
Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



c. Tighten the lower ring nut "4" with the steering nut wrench "5".

TIP
Set a torque wrench at a right angle to the steering nut wrench.

Lower ring nut (initial tightening torque)
38 Nm (3.8 m·kg, 27 ft·lb)



d. Loosen the lower ring nut completely, and then tighten it to specification with a steering nut wrench.

EWA13140

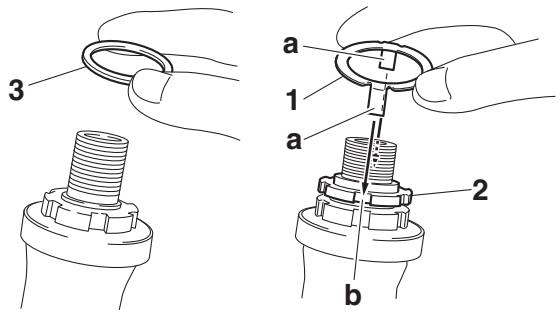
⚠ WARNING

Do not overtighten the lower ring nut.

Lower ring nut (final tightening torque)
4 Nm (0.4 m·kg, 2.9 ft·lb)

e. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to "STEERING HEAD" on page 4-19.
f. Install the rubber washer "3".
g. Install the upper ring nut "2".
h. Finger tighten the upper ring nut "2", then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
i. Install the lock washer "1".

TIP
Make sure the lock washer tabs "a" sit correctly in the ring nut slots "b".



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5. Install:
   • Upper bracket
   Refer to "STEERING HEAD" on page 4-19.

EAS1P6U316
LUBRICATING THE STEERING HEAD
1. Lubricate:
   • Upper bearing
   • Lower bearing
   • Bearing races
   • Ring nut threads

	Recommended lubricant **Lithium-soap-based grease**

EAS1P6U317
CHECKING THE FASTENERS
1. Check:
   • Fasteners
   Damage/pitting → Replace.
   Refer to "GENERAL CHASSIS" on page 4-1.

EAS21701
LUBRICATING THE BRAKE LEVER
Lubricate the pivoting point and metal-to-metal moving parts of the brake lever.

	Recommended lubricant **Lithium-soap-based grease**

EAS21711
LUBRICATING THE BRAKE PEDAL
Lubricate the pivoting point and metal-to-metal moving parts of the brake pedal.

	Recommended lubricant **Lithium-soap-based grease**

EAS1P6U318
CHECKING THE SIDESTAND
1. Check:
   • Sidestand operation
   Check that the sidestand moves smoothly.
   Rough movement → Repair or replace.

EAS21720
LUBRICATING THE SIDESTAND
Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

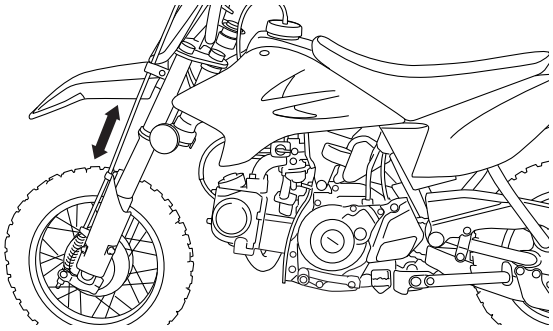
	Recommended lubricant **Lithium-soap-based grease**

EAS21531
CHECKING THE FRONT FORK
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Check:
   • Inner tube
   Damage/scratches → Replace.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   • Front fork operation
   Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
   Rough movement → Repair.
   Refer to "FRONT FORK" on page 4-17.

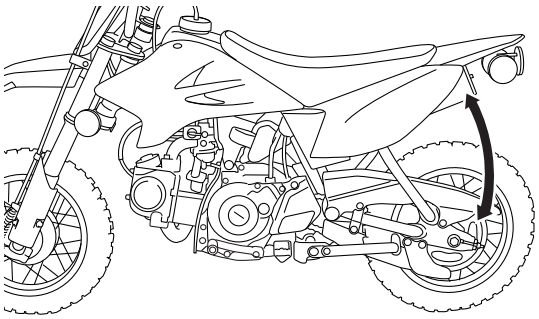


EAS1P6U310
CHECKING THE REAR SHOCK ABSORBER
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Check:
   • Rear shock absorber
   Damage/oil leakage → Replace.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   • Swingarm operation
   Push down hard on the seat several times and check if the rear shock absorber rebounds smoothly.
   Rough movement → Repair the pivoting points.



EAS21740
LUBRICATING THE REAR SHOCK ABSORBER
Lubricate the pivoting points and metal-to-metal moving parts of the rear shock absorber.

	Recommended lubricant **Lithium-soap-based grease**

EAS21690
CHECKING AND LUBRICATING THE CABLES
The following procedure applies to all of the inner and outer cables.

EWA1P6U312
⚠ WARNING

A damaged outer cable may cause the inner cable to corrode and interfere with its movement. Replace damaged outer cables and inner cables as soon as possible.

1. Check:
   - Outer cable
     Damage → Replace.
2. Check:
   - Cable operation
     Rough movement → Lubricate.

	Recommended lubricant **Engine oil or a suitable cable lubricant**

TIP
Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

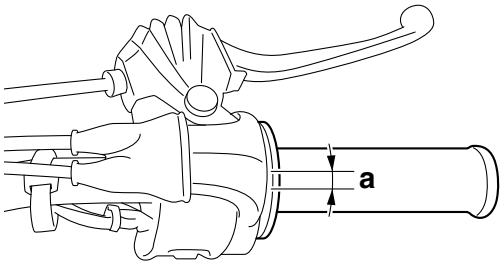
EAS1P6U311
CHECKING THE THROTTLE GRIP OPERATION
1. Check:
   - Throttle cables
     Damage/deterioration → Replace.
   - Throttle cable installation
     Incorrect → Reinstall the throttle cables.
     Refer to "HANDLEBAR" on page 4-14.
2. Check:
   - Throttle grip movement
     Rough movement → Lubricate or replace the defective part(s).

	Recommended lubricant **Suitable cable lubricant**

TIP
With the engine stopped, turn the throttle grip slowly and release it. Make sure that the throttle grip turns smoothly and returns properly when released.
Repeat this check with the handlebar turned all the way to the left and right.

3. Check:
   - Throttle grip free play "a"
     Out of specification → Adjust.

	Throttle grip free play **3.0–5.0 mm (0.12–0.20 in)**



4. Remove:
   - Seat assembly
   - Air scoop (right)
     Refer to "GENERAL CHASSIS" on page 4-1.
5. Adjust:
   - Throttle grip free play

TIP
Prior to adjusting the throttle grip free play, the engine idling speed should be adjusted.

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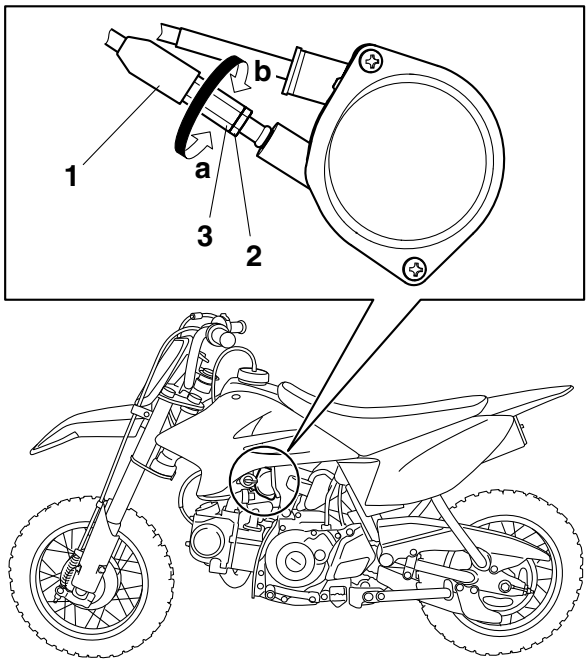
Carburetor side

a. Slide back the rubber cover "1".

b. Loosen the locknut “2”.
c. Turn the adjusting nut “3” in direction “a” or “b” until the specified throttle grip free play is obtained.

Direction “a”
Throttle grip free play is increased.
Direction “b”
Throttle grip free play is decreased.



d. Tighten the locknut.
e. Slide the rubber cover to its original position.

TIP
If the specified throttle grip free play cannot be obtained on the carburetor side of the cable, use the adjusting nut on the handlebar side.

EWA1P6U314

⚠ WARNING

After adjusting the throttle grip free play, start the engine and turn the handlebar to the right or left to ensure that this does not cause the engine idling speed to change.

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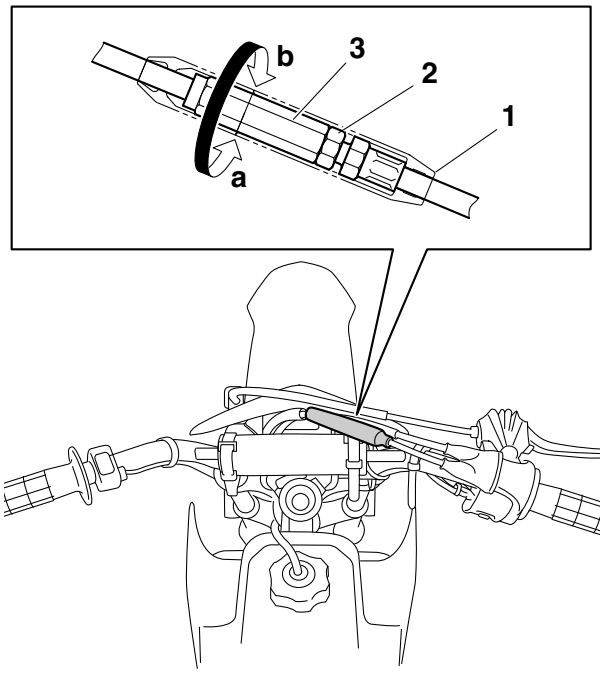
Handlebar side

a. Slide back the rubber cover “1”.
b. Loosen the locknut “2”.
c. Turn the adjusting nut “3” in direction “a” or “b” until the specified throttle grip free play is obtained.

Direction “a”
Throttle grip free play is increased.
Direction “b”
Throttle grip free play is decreased.



d. Tighten the locknut.
e. Slide the rubber cover to its original position.

TIP
Make sure that the adjusting nut is covered completely by the rubber cover.

EWA1P6U313

⚠ WARNING

After adjusting the throttle grip free play, start the engine and turn the handlebar to the right or left to ensure that this does not cause the engine idling speed to change.

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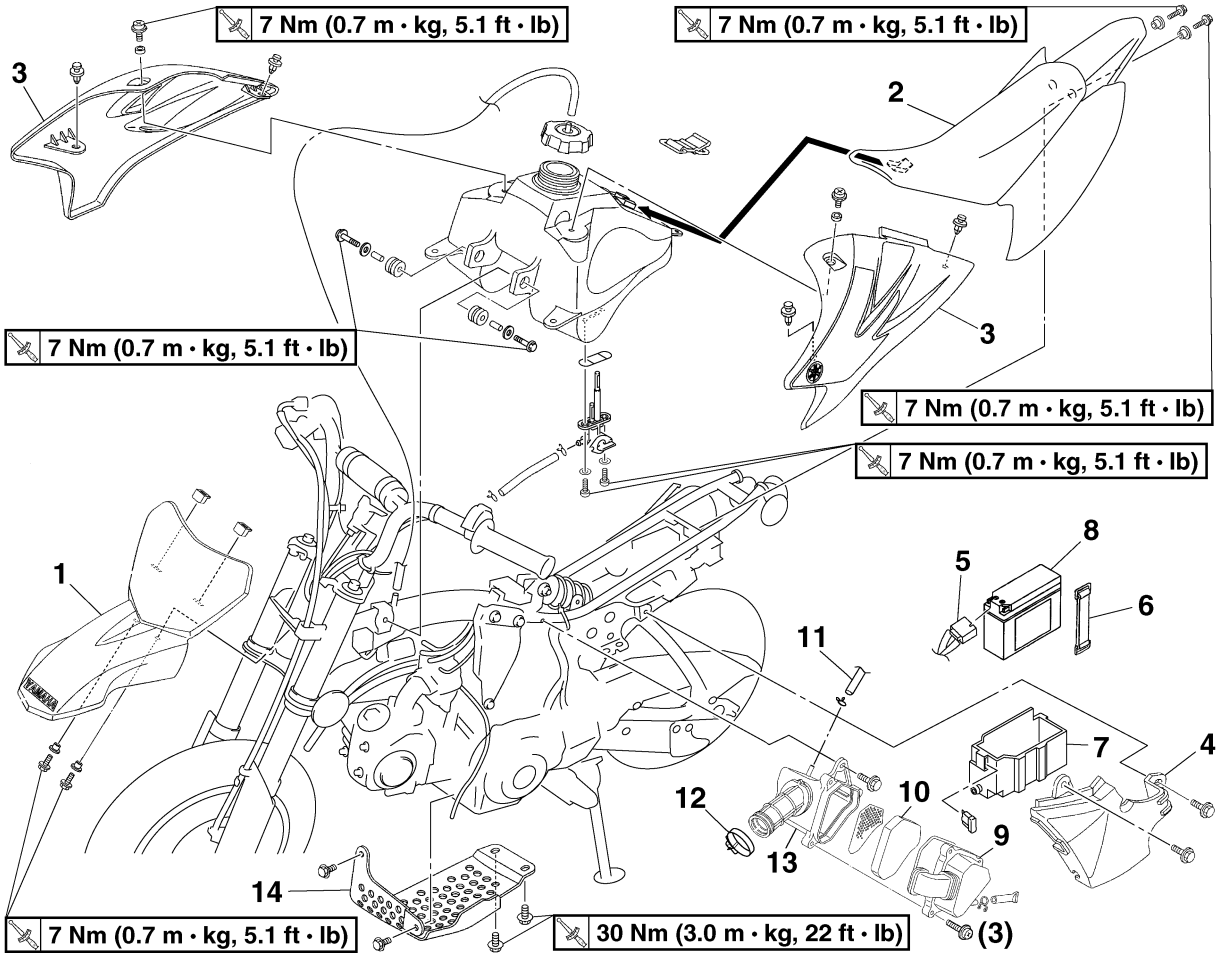
6. Install:
   - Air scoop (right)
   - Seat assembly
     Refer to “GENERAL CHASSIS” on page 4-1.

CHASSIS

EAS21830
GENERAL CHASSIS

Removing the front fender, seat assembly and air scoops

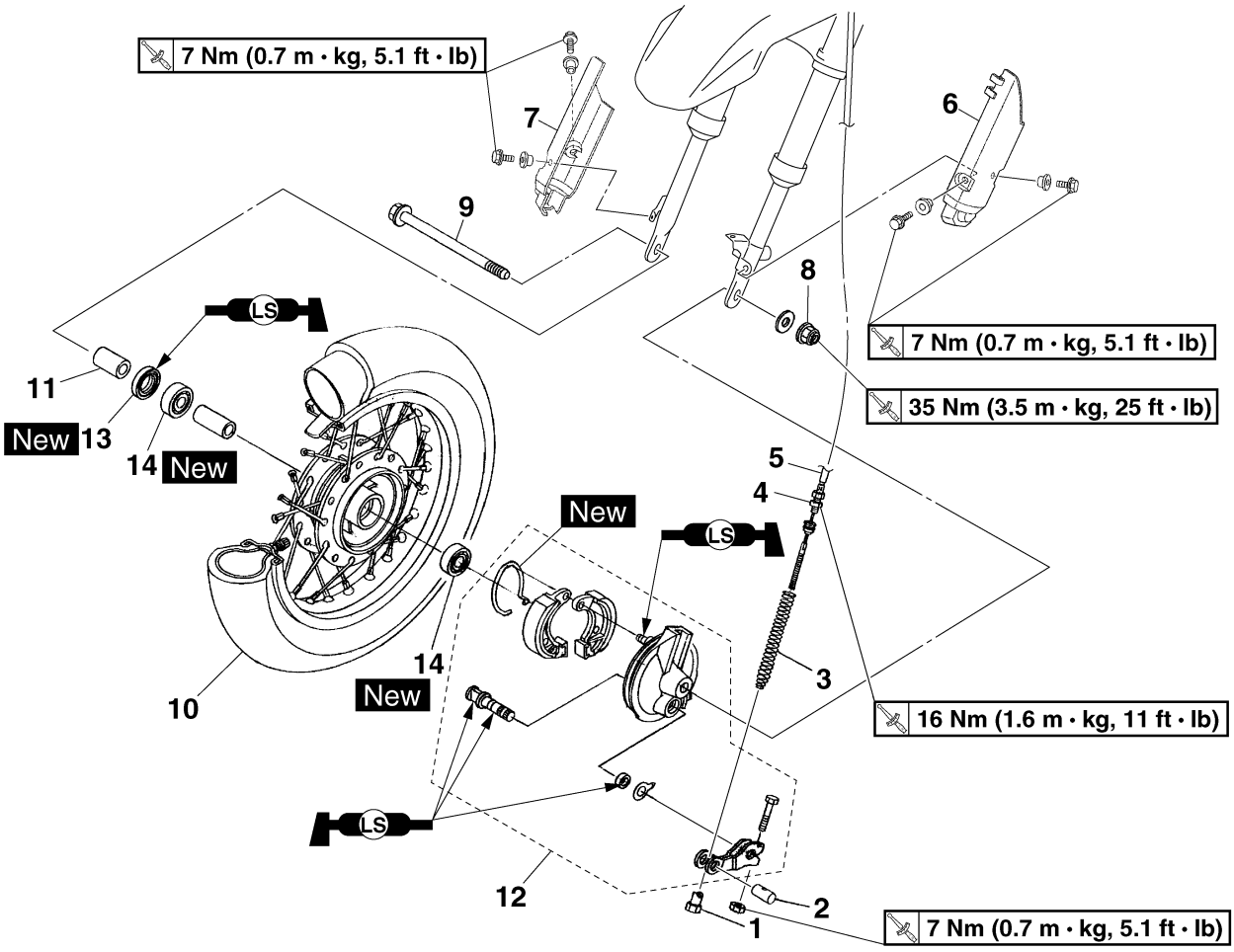


Order	Job/Parts to remove	Q'ty	Remarks
1	Front fender	1	
2	Seat assembly	1	
3	Air scoop (right and left)	2	
4	Battery cover	1	
5	Battery coupler	1	Disconnect.
6	Battery band	1	
7	Battery rubber cover	1	
8	Battery	1	
9	Air filter case cover	1	
10	Air filter element	1	
11	Crankcase breather hose	1	Disconnect.
12	Air filter joint clamp screw	1	Loosen.
13	Air filter case	1	
14	Engine guard	1	
			For installation, reverse the removal procedure.

EAS21870

FRONT WHEEL

Removing the front wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake adjusting nut	1	
2	Pin	1	
3	Spring	1	
4	Locknut	1	
5	Brake cable	1	Disconnect.
6	Front fork guard (left)	1	
7	Front fork guard (right)	1	
8	Front wheel axle nut	1	
9	Front wheel axle	1	
10	Front wheel	1	
11	Spacer	1	
12	Front brake shoe plate assembly	1	
13	Oil seal	1	
14	Bearing	2	
			For installation, reverse the removal procedure.

EAS21890
REMOVING THE FRONT WHEEL

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Elevate:
   • Front wheel

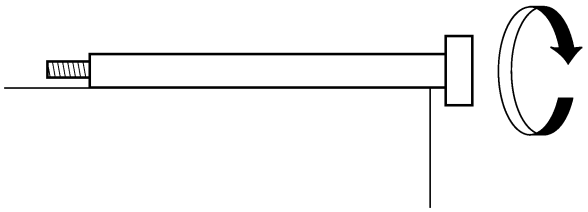
TIP
Place the vehicle on a suitable stand so that the front wheel is elevated.

EAS21932
CHECKING THE FRONT WHEEL

1. Check:
   • Wheel axle
   Roll the wheel axle on a flat surface.
   Bends → Replace.

EWA13460
⚠ WARNING

Do not attempt to straighten a bent wheel axle.

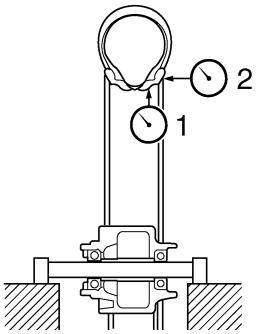


2. Check:
   • Tire
   • Front wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-13 and "CHECKING THE WHEELS" on page 3-12.
3. Check:
   • Spokes
   Bends/damage → Replace.
   Loose → Tighten.
   Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-12.

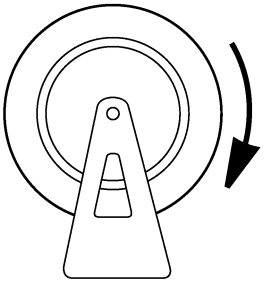
TIP
After tightening the spokes, measure the front wheel runout.

4. Measure:
   • Radial wheel runout "1"
   • Lateral wheel runout "2"
   Over the specified limits → Replace.

Radial wheel runout limit
2.0 mm (0.08 in)
Lateral wheel runout limit
2.0 mm (0.08 in)



5. Check:
   • Spacer
   Damage/wear → Replace.
6. Check:
   • Wheel bearings
   Front wheel turns roughly or is loose → Replace the wheel bearings.
   • Oil seal
   Damage/wear → Replace.



7. Replace:
   • Wheel bearings New
   • Oil seal New

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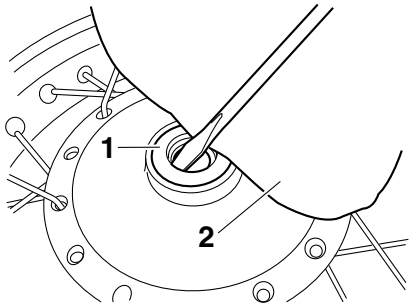
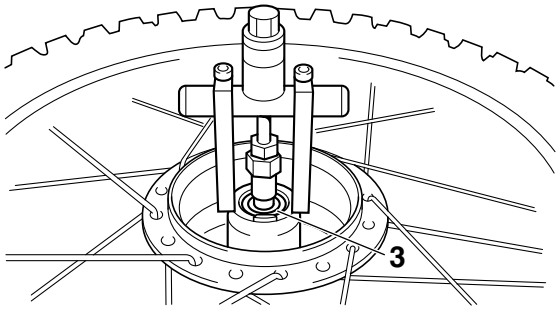
a. Clean the outside of the front wheel hub.
b. Remove the oil seal "1" with a flat-head screwdriver.

TIP
To prevent damaging the wheel, place a rag "2" between the screwdriver and the wheel surface.



c. Remove the wheel bearings “3” with a general bearing puller.



d. Install the new wheel bearings and oil seals in the reverse order of disassembly.

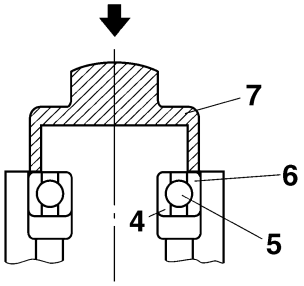
ECA14131

NOTICE

Do not contact the wheel bearing inner race “4” or balls “5”. Contact should be made only with the outer race “6”.

TIP

Use a socket “7” that matches the diameter of the wheel bearing outer race and oil seal.



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EAS21980

INSTALLING THE FRONT WHEEL (DRUM)

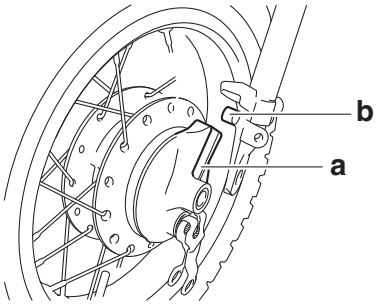
1. Lubricate:
   - Wheel axle
   - Wheel bearings
   - Oil seal lips

	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Front wheel

TIP

Make sure that the slot “a” on the brake shoe plate with the stopper “b” on the front fork inner tube.



3. Tighten:
   - Front wheel axle nut

	Front wheel axle nut **35 Nm (3.5 m·kg, 25 ft·lb)**

ECA14140

NOTICE

Before tightening the wheel axle nut, push down hard on the handlebar(s) several times and check if the front fork rebounds smoothly.

4. Install:
   - Spring “1”
   - Pin “2”

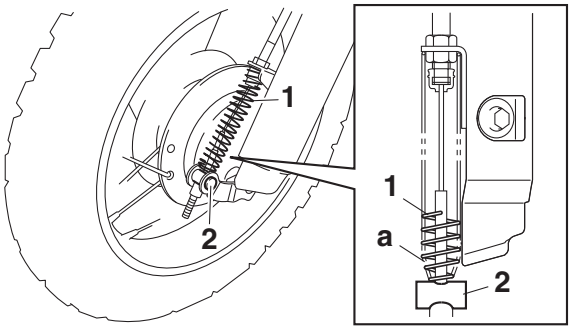
EWA13490

⚠ WARNING

Make sure the brake cable is routed properly.

TIP

Install the spring “1” with its smaller diameter end “a” towards the pin “2”.



5. Adjust:
   - Front brake lever free play

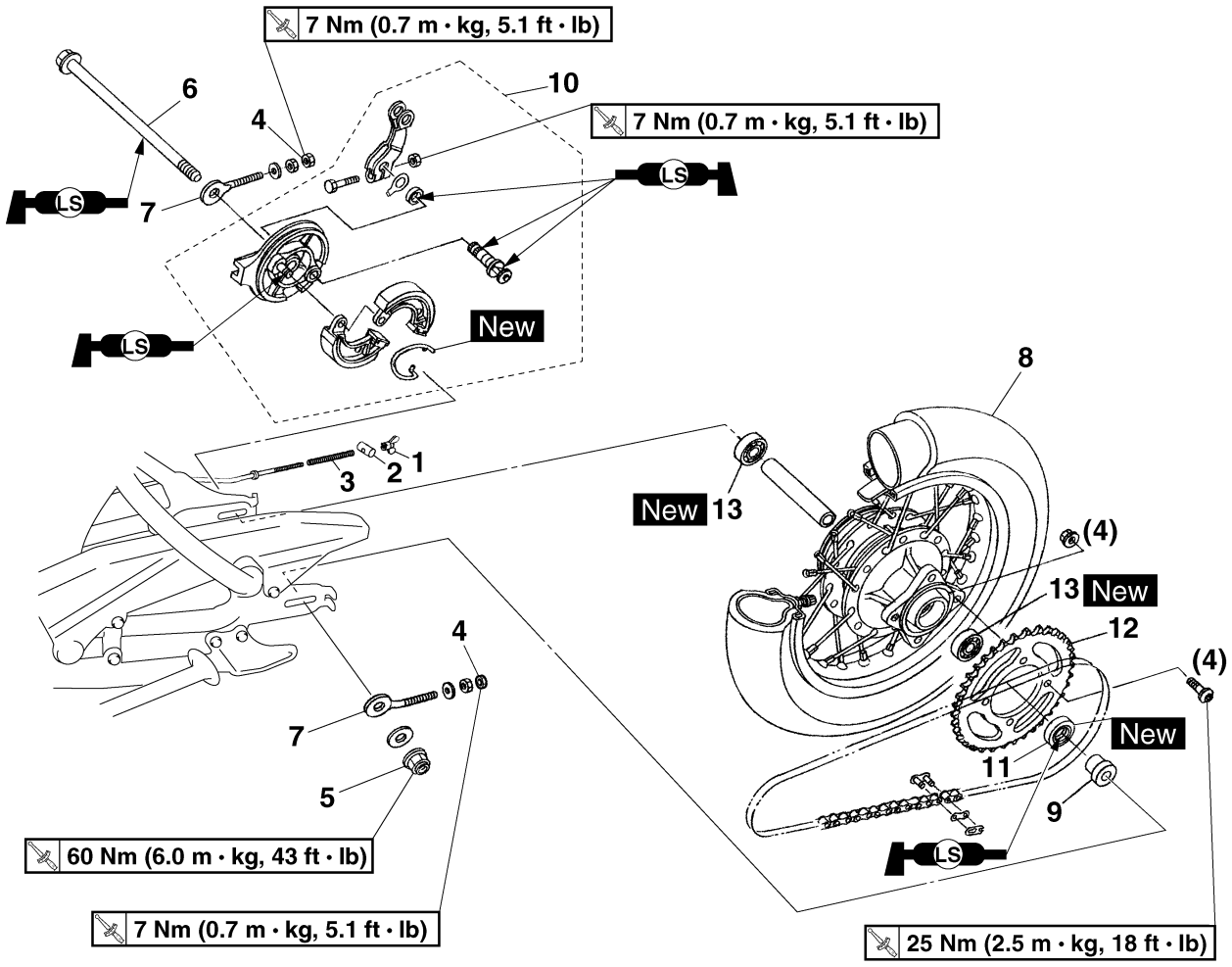
Refer to “ADJUSTING THE FRONT DRUM BRAKE” on page 3-10.

Front brake lever free play
10.0–20.0 mm (0.39–0.79 in)

EAS22020

REAR WHEEL

Removing the rear wheel and rear wheel sprocket



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake pedal adjusting nut	1	
2	Pin	1	
3	Spring	1	
4	Drive chain puller locknut	2	
5	Rear wheel axle nut	1	
6	Rear wheel axle	1	
7	Drive chain puller	2	
8	Rear wheel	1	
9	Collar	1	
10	Brake shoe plate assembly	1	
11	Oil seal	1	
12	Rear wheel sprocket	1	
13	Bearing	2	
			For installation, reverse the removal procedure.

EAS22060
REMOVING THE REAR WHEEL (DRUM)
1. Stand the vehicle on a level surface.

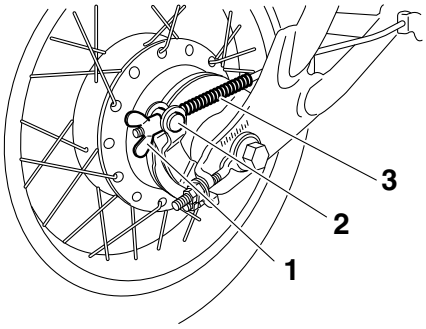
EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - Rear brake pedal adjusting nut "1"
   - Pin "2"
   - Spring "3"

TIP
Press down on the brake pedal to remove the pin from the brake rod.



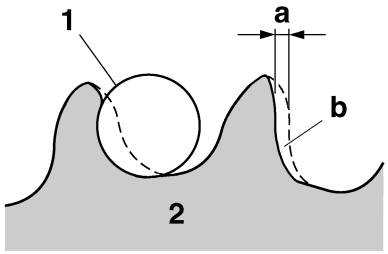
3. Remove:
   - Rear wheel

TIP
Push the rear wheel forward and remove the drive chain from the rear wheel sprocket.

EAS22101
CHECKING THE REAR WHEEL
1. Check:
   - Rear wheel axle
   - Rear wheel
   - Wheel bearings
   Refer to "CHECKING THE FRONT WHEEL" on page 4-3.
2. Check:
   - Tire
   - Rear wheel
   Damage/wear → Replace.
   Refer to "CHECKING THE TIRES" on page 3-13 and "CHECKING THE WHEELS" on page 3-12.
3. Check:
   - Spokes
   Refer to "CHECKING AND TIGHTENING THE SPOKES" on page 3-12.
4. Measure:
   - Radial wheel runout
   - Lateral wheel runout
   Refer to "CHECKING THE FRONT WHEEL" on page 4-3.

EAS22110
CHECKING THE REAR WHEEL DRIVE HUB
1. Check:
   - Rear wheel drive hub
   Cracks/damage → Replace.
   - Rear wheel drive hub dampers
   Damage/wear → Replace.

EAS22121
CHECKING AND REPLACING THE REAR WHEEL SPROCKET
1. Check:
   - Rear wheel sprocket
   More than 1/4 tooth "a" wear → Replace the rear wheel sprocket, drive chain, drive chain sprocket as a set.
   Bent teeth → Replace the rear wheel sprocket, drive chain, drive chain sprocket as a set.



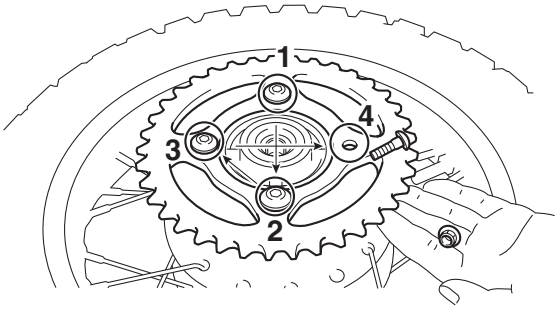
b. Correct

1. Drive chain roller
2. Rear wheel sprocket

EAS22180
INSTALLING THE REAR WHEEL (DRUM)
1. Install:
   - Rear wheel sprocket
   - Rear wheel sprocket bolts
   - Rear wheel sprocket nuts

	**Rear wheel sprocket bolt 25 Nm (2.5 m·kg, 18 ft·lb)**

TIP
- Tighten the bolts in the proper tightening sequence as shown in the illustration.
- Install the rear wheel sprocket with the gear teeth number mark facing outward.



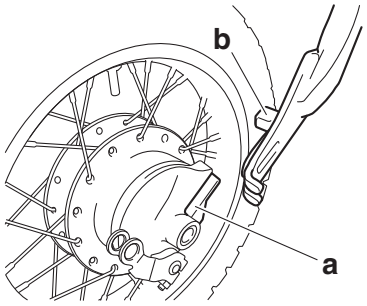
2. Lubricate:
   • Rear wheel axle
   • Wheel bearings
   • Oil seal

	Recommended lubricant **Lithium-soap-based grease**

3. Install:
   • Rear wheel

TIP

Make sure that the slot "a" on the brake shoe plate with the stopper "b" on the swingarm.



4. Adjust:
   • Drive chain slack
   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-14.

	Drive chain slack **35.0–45.0 mm (1.38–1.77 in)**

5. Tighten:
   • Rear wheel axle nut

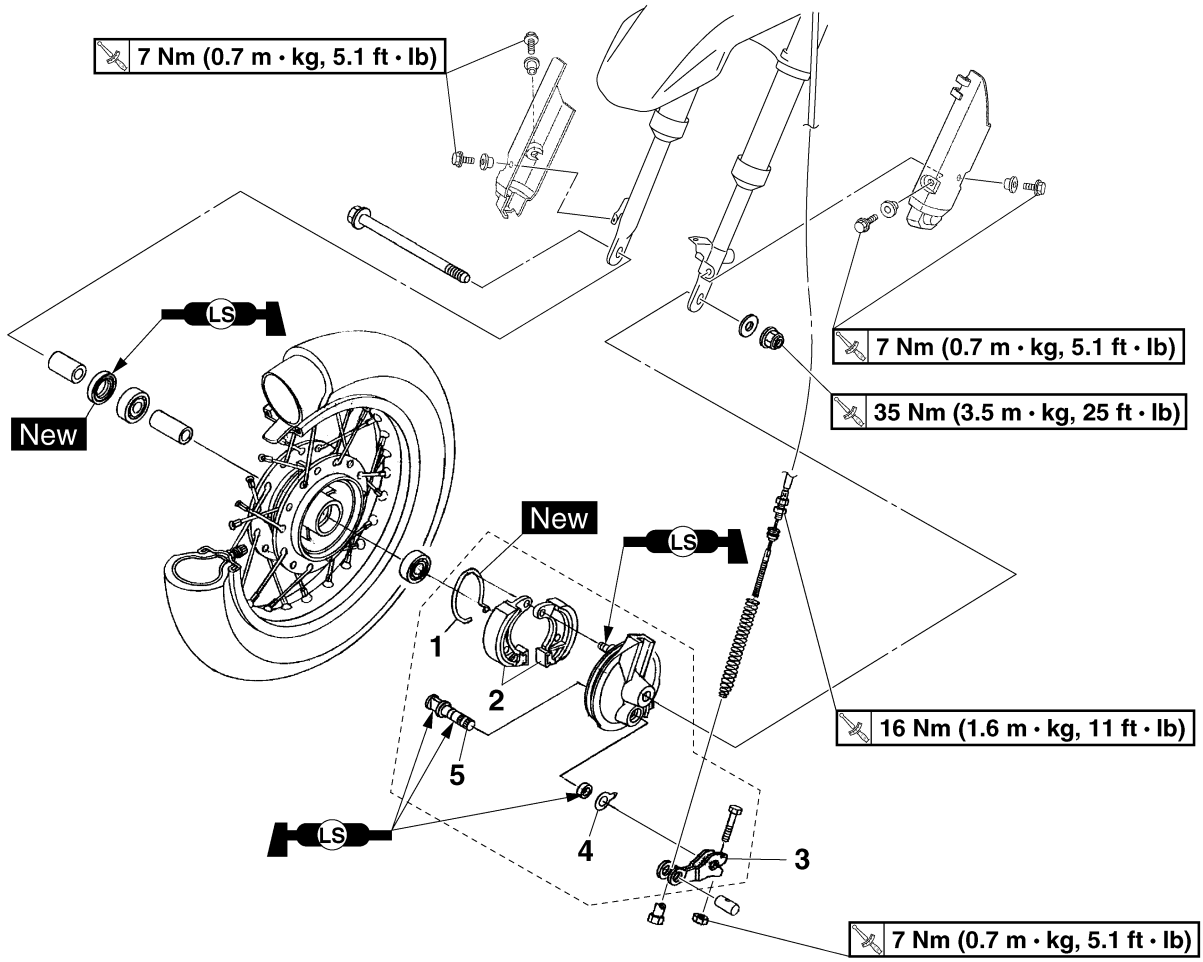
	Rear wheel axle nut **60 Nm (6.0 m·kg, 43 ft·lb)**

6. Adjust:
   • Brake pedal free play
   Refer to "ADJUSTING THE REAR DRUM BRAKE" on page 3-11.

	Brake pedal free play **10.0–20.0 mm (0.39–0.79 in)**

EAS22210
FRONT BRAKE

Disassembling the front brake shoes



Order	Job/Parts to remove	Q'ty	Remarks
	Front wheel		Refer to "FRONT WHEEL" on page 4-2.
1	Brake shoe spring	1	
2	Brake shoe	2	
3	Brake camshaft lever	1	
4	Wear indicator plate	1	
5	Brake camshaft	1	
			For assembly, reverse the disassembly procedure.

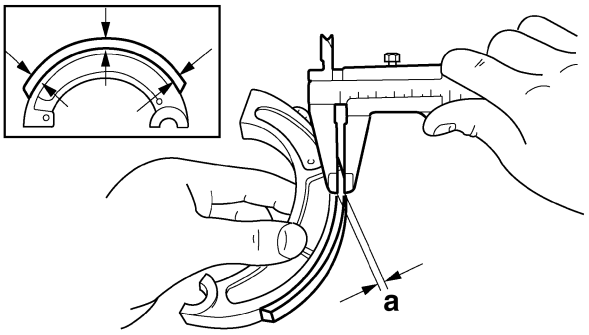
EAS22470
CHECKING THE FRONT BRAKE SHOES

1. Check:
   • Brake shoe lining
   Glazed areas → Repair.
   Sand the glazed areas with coarse sandpaper.

TIP
After sanding the glazed areas, clean the brake shoe with a cloth.

2. Measure:
   • Lining thickness “a”
   Out of specification → Replace.

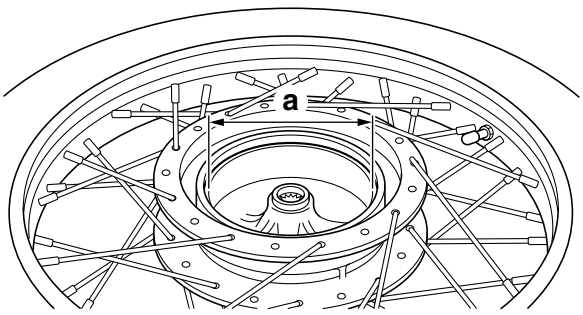
Lining thickness
3.5 mm (0.14 in)
Limit
1.5 mm (0.06 in)



EWA1P6U405
⚠ WARNING
Do not allow oil or grease on the brake shoes.

TIP
Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:
   • Brake drum inside diameter “a”
   Out of specification → Replace the wheel.



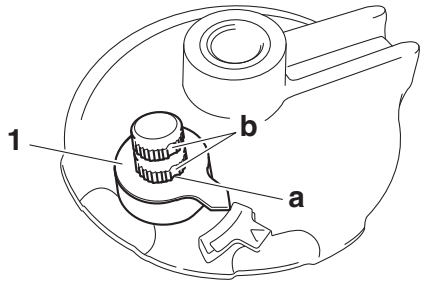
Brake drum inside diameter
80.0 mm (3.15 in)
Limit
80.5 mm (3.17 in)

4. Check:
   • Brake drum inner surface
   Oil deposits → Clean.
   Remove the oil with a rag soaked in lacquer thinner or solvent.
   Scratches → Repair.
   Lightly and evenly polish the scratches with an emery cloth.
5. Check:
   • Brake camshaft
   Damage/wear → Replace.

EAS22480
ASSEMBLING THE FRONT BRAKE SHOE PLATE

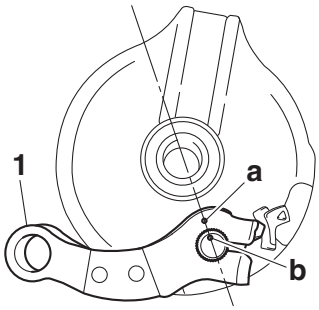
1. Install:
   • Brake camshaft
   • Brake shoe wear indicator plate “1”

TIP
When installing the wear indicator plate to the brake camshaft align the projection “a” on the wear indicator plate with the slots “b” on the brake camshaft.



2. Install:
   • Brake camshaft lever “1”

TIP
Align the punch mark “a” on the brake camshaft lever with the punch mark “b” on the brake camshaft.



3. Install:
   • Brake shoe spring “1” New
   • Brake shoes “2”

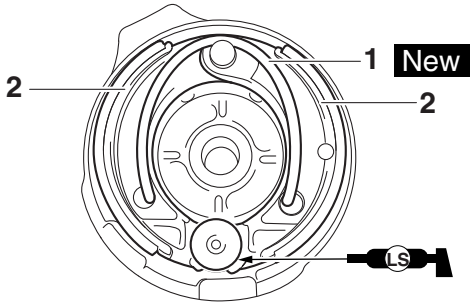
TIP

Apply lithium-soap-based grease on the pivot pin.

EWA1P6U406

⚠ WARNING

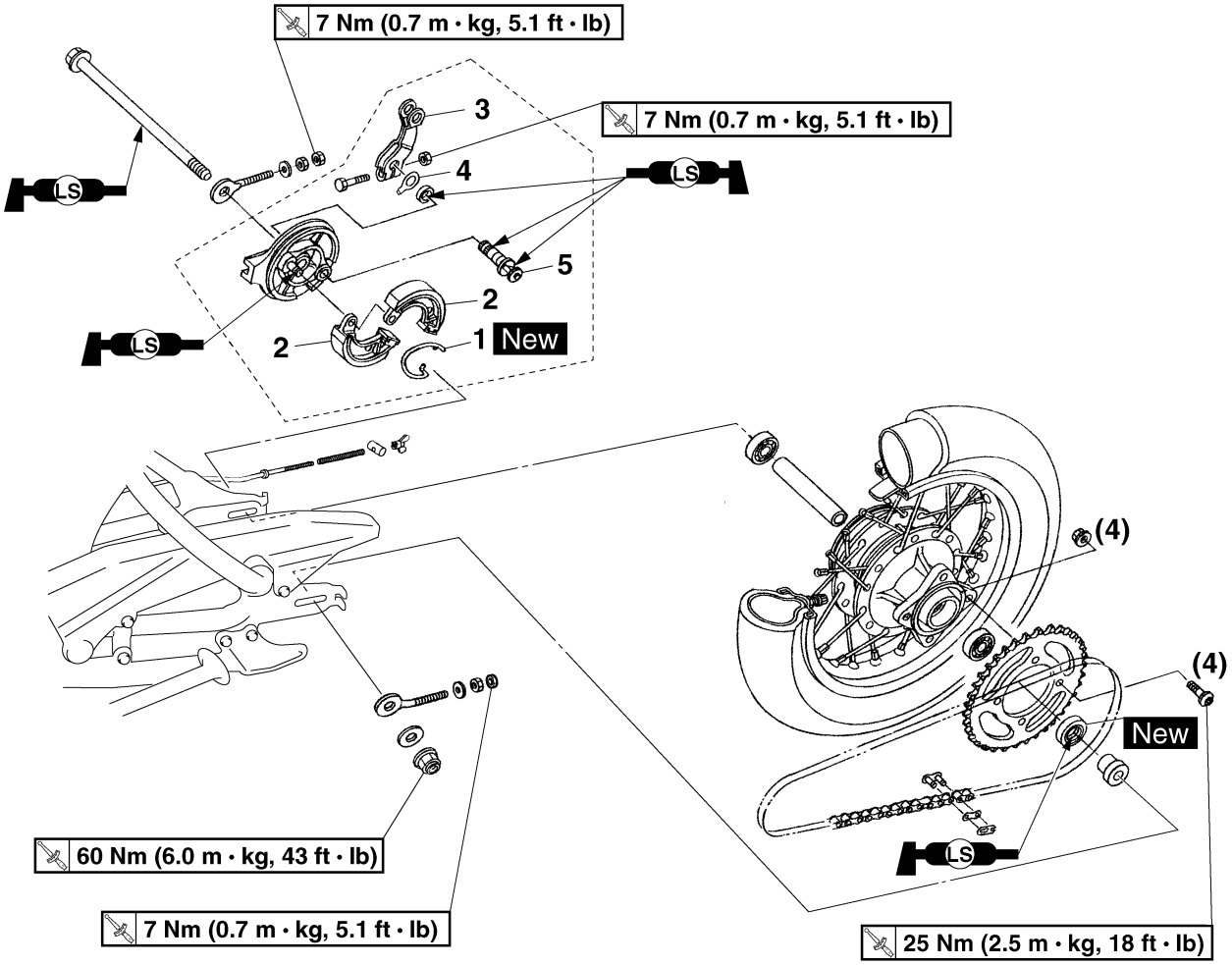
Do not apply grease to the brake shoe linings.



EAS22550

REAR BRAKE

Disassembling the rear brake shoes



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-6.
1	Brake shoe spring	1	
2	Brake shoe	2	
3	Brake camshaft lever	1	
4	Wear indicator plate	1	
5	Brake camshaft	1	
			For assembly, reverse the disassembly procedure.

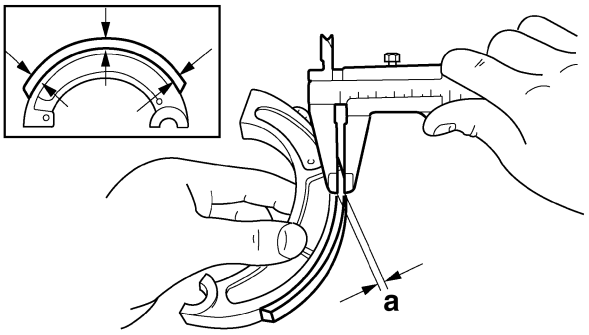
EAS22681
CHECKING THE REAR BRAKE SHOES

1. Check:
   • Brake shoe lining
   Glazed areas → Repair.
   Sand the glazed areas with coarse sandpaper.

TIP
After sanding the glazed areas, clean the brake shoe with a cloth.

2. Measure:
   • Lining thickness "a"
   Out of specification → Replace.

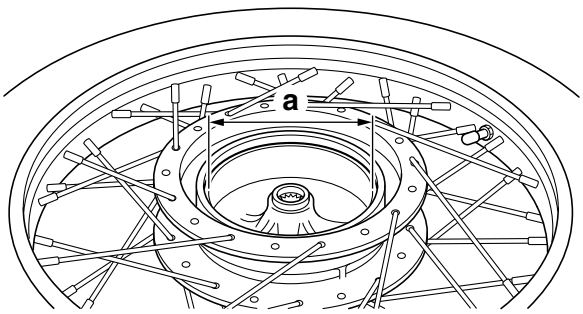
Lining thickness
3.5 mm (0.14 in)
Limit
1.5 mm (0.06 in)



EWA1P6U407
WARNING
Do not allow oil or grease on the brake shoes.

TIP
Replace the brake shoes as a set, if either is worn to the wear limit.

3. Measure:
   • Brake drum inside diameter "a"
   Out of specification → Replace the wheel.



Brake drum inside diameter
80.0 mm (3.15 in)
Limit
80.5 mm (3.17 in)

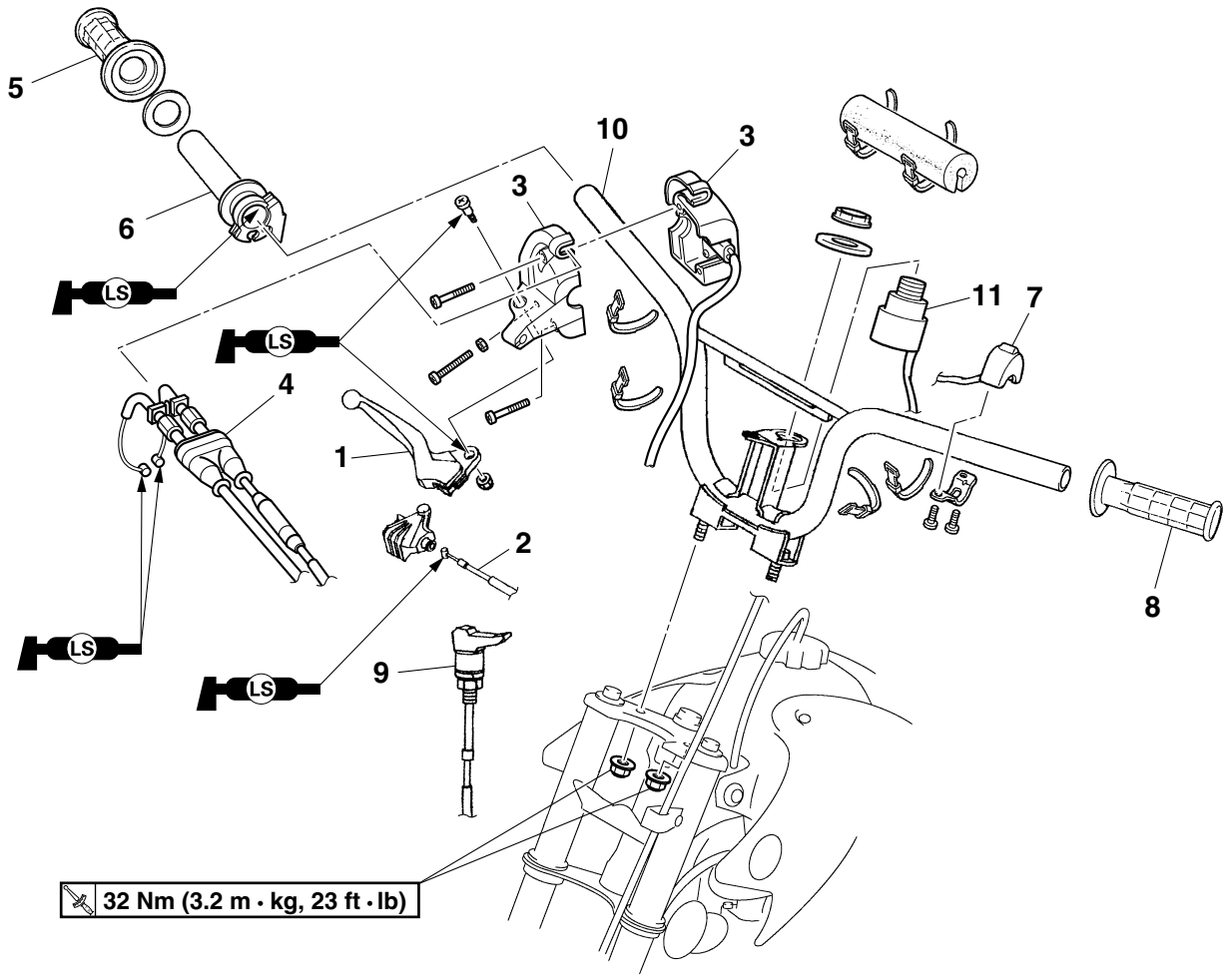
4. Check:
   • Brake drum inner surface
   Oil deposits → Clean.
   Remove the oil with a rag soaked in lacquer thinner or solvent.
   Scratches → Repair.
   Lightly and evenly polish the scratches with an emery cloth.
5. Check:
   • Brake camshaft
   Damage/wear → Replace.

EAS22690
ASSEMBLING THE REAR BRAKE SHOE PLATE

1. Install:
   • Brake camshaft
   • Brake shoe wear indicator
   Refer to "ASSEMBLING THE FRONT BRAKE SHOE PLATE" on page 4-10.
2. Install:
   • Brake camshaft lever
   Refer to "ASSEMBLING THE FRONT BRAKE SHOE PLATE" on page 4-10.
3. Install:
   • Brake shoe spring New
   • Brake shoes
   Refer to "ASSEMBLING THE FRONT BRAKE SHOE PLATE" on page 4-10.

EAS22840
HANDLEBAR

Removing the handlebar



Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "GENERAL CHASSIS" on page 4-1.
1	Brake lever	1	
2	Brake cable	1	Disconnect.
3	Throttle grip housing	2	
4	Throttle cable	1	Disconnect.
5	Throttle grip	1	
6	Throttle grip inner tube guide	1	
7	Engine stop switch	1	
8	Handlebar grip	1	
9	Starter lever	1	
10	Handlebar	1	
11	Main switch	1	
			For installation, reverse the removal procedure.

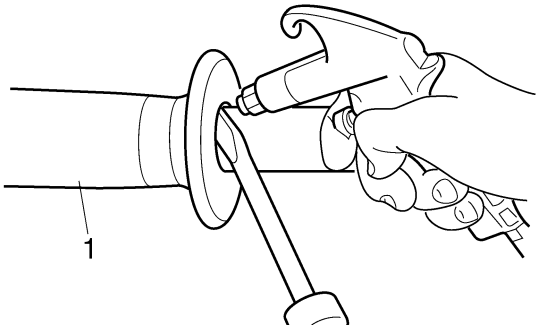
EAS22860
REMOVING THE HANDLEBAR
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   • Handlebar grip “1”

TIP
Blow compressed air between the left handlebar and the handlebar grip, and gradually push the grip off the handlebar.



EAS22880
CHECKING THE HANDLEBAR
1. Check:
   • Handlebar
   Bends/cracks/damage → Replace.

EWA13690
⚠ WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS22911
INSTALLING THE HANDLEBAR
1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
   • Handlebar

	Handlebar nut **32 Nm (3.2 m·kg, 23 ft·lb)**

3. Install:
   • Handlebar grip “1”

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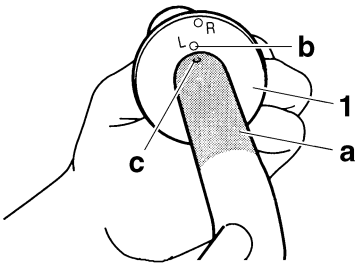
a. Apply a thin coat of rubber adhesive onto the left end of the handlebar.
b. Slide the handlebar grip over the left end of the handlebar.

TIP
- Before applying the adhesive, wipe off grease or oil on the handlebar surface “a” with a lacquer thinner.
- Be sure to align the projection “L” “b” on the handlebar grip with the punch mark “c” on the handlebar.



c. Wipe off any excess rubber adhesive with a clean rag.

EWA13700
⚠ WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

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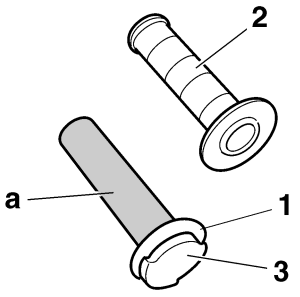
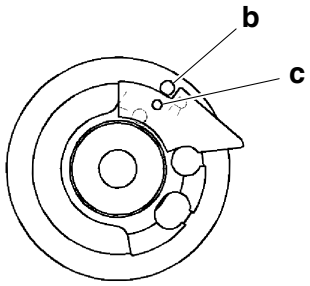
4. Install:
   • Collar “1”
   • Throttle grip “2”
   (to throttle grip inner tube guide “3”)

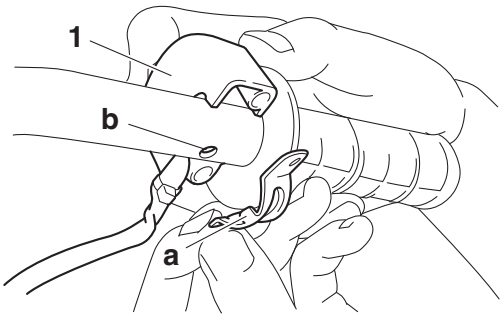
TIP
- Before applying the adhesive, wipe off grease or oil on the throttle grip inner tube guide “3” surface “a” with a lacquer thinner.
- Align the mating mark “b” on the throttle grip with the mating mark “c” in the throttle grip inner tube guide.





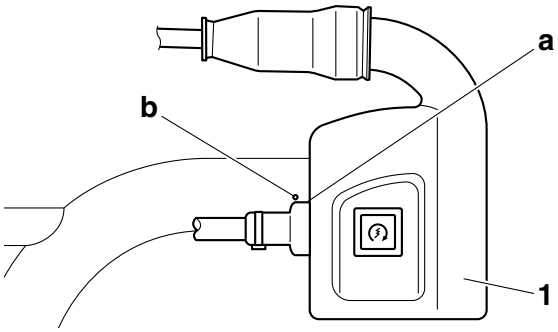
5. Install:
   • Engine stop switch “1”

TIP
Align the projection “a” on the engine stop switch with the hole “b” in the handlebar.



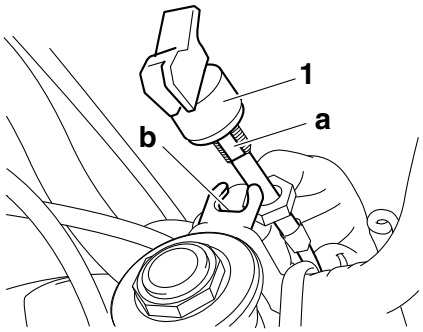
6. Install:
   • Throttle cable
   • Throttle grip housing “1”

TIP
Align the mating surface “a” of the throttle grip housing with the punch mark “b” on the handlebar.



7. Install:
   • Starter lever “1”

TIP
Be sure to align the flat section “a” of the starter lever “1” with the flat section “b” of the bracket on the handlebar.



8. Adjust:
   • Throttle grip free play
   Refer to “CHECKING THE THROTTLE GRIP OPERATION” on page 3-18.

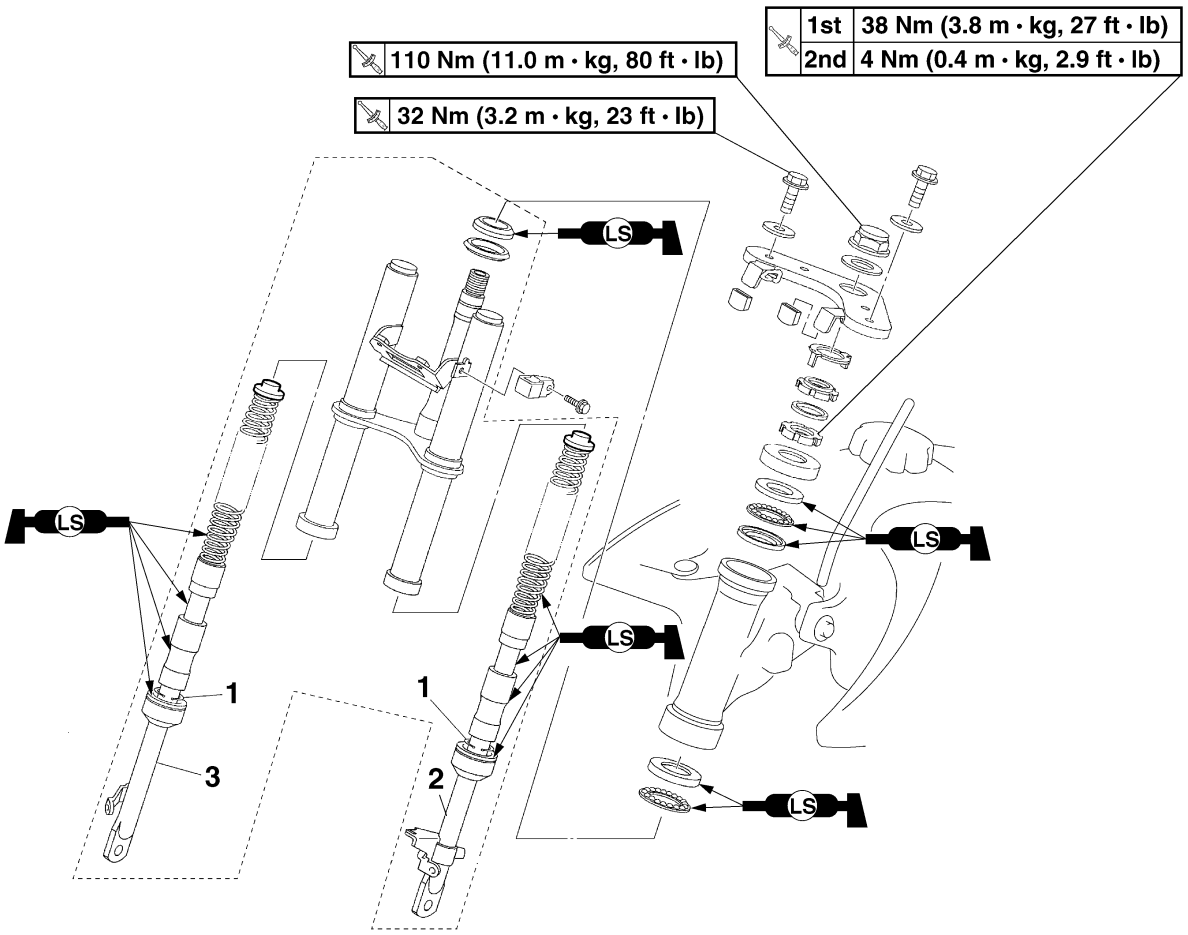
	Throttle grip free play **3.0–5.0 mm (0.12–0.20 in)**

9. Adjust:
   • Front brake lever free play
   Refer to “ADJUSTING THE FRONT DRUM BRAKE” on page 3-10.

	Front brake lever free play **10.0–20.0 mm (0.39–0.79 in)**

EAS22950
FRONT FORK

Removing the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "GENERAL CHASSIS" on page 4-1.
	Front wheel		Refer to "FRONT WHEEL" on page 4-2.
	Handlebar		Refer to "HANDLEBAR" on page 4-14.
	Upper bracket		Refer to "STEERING HEAD" on page 4-19.
1	Circlip	2	
2	Inner tube assembly (left)	1	
3	Inner tube assembly (right)	1	
			For installation, reverse the removal procedure.

EAS23011
CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:
   - Inner tube
   - Outer tube

   Bends/damage/scratches → Replace.

EWA13650
⚠ WARNING

Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
   - Spring free length

   Out of specification → Replace.

Fork spring free length
156.1 mm (6.15 in)
Limit
153.0 mm (6.02 in)

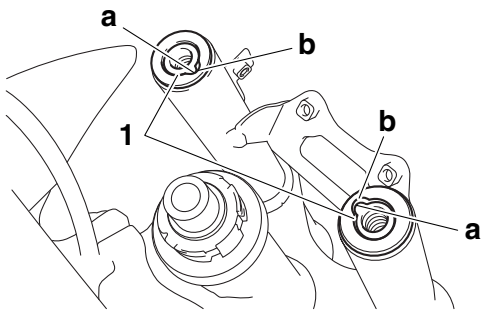
EAS23060
INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:
   - Inner tube assemblies “1”
   - Upper bracket

TIP

When installing an inner tube assembly in the lower bracket, align the projections “a” on the inner tube assemblies with the indentation “b” in the lower bracket.

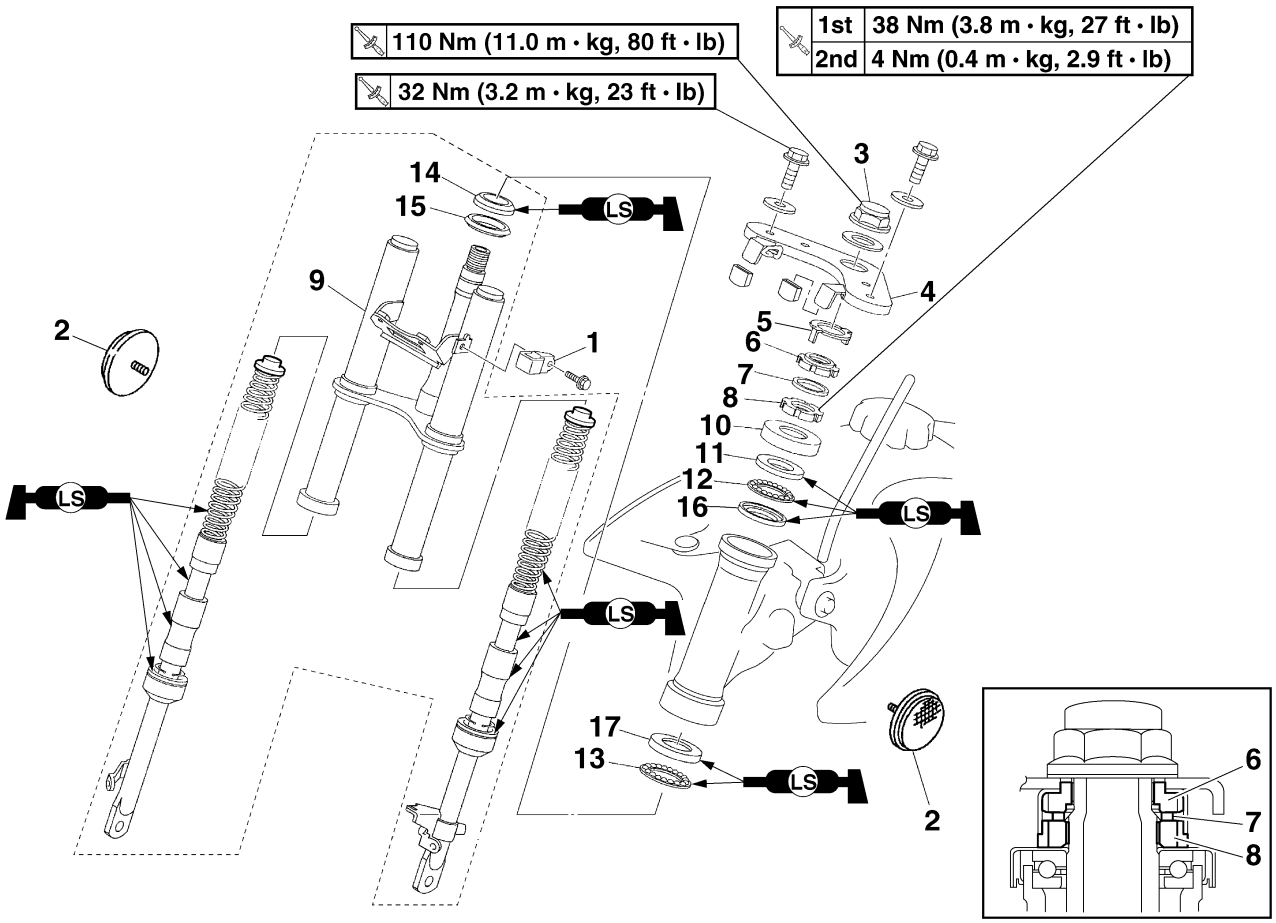


2. Tighten:
   - Front fork assembly bolts

Front fork assembly bolt
32 Nm (3.2 m·kg, 23 ft·lb)

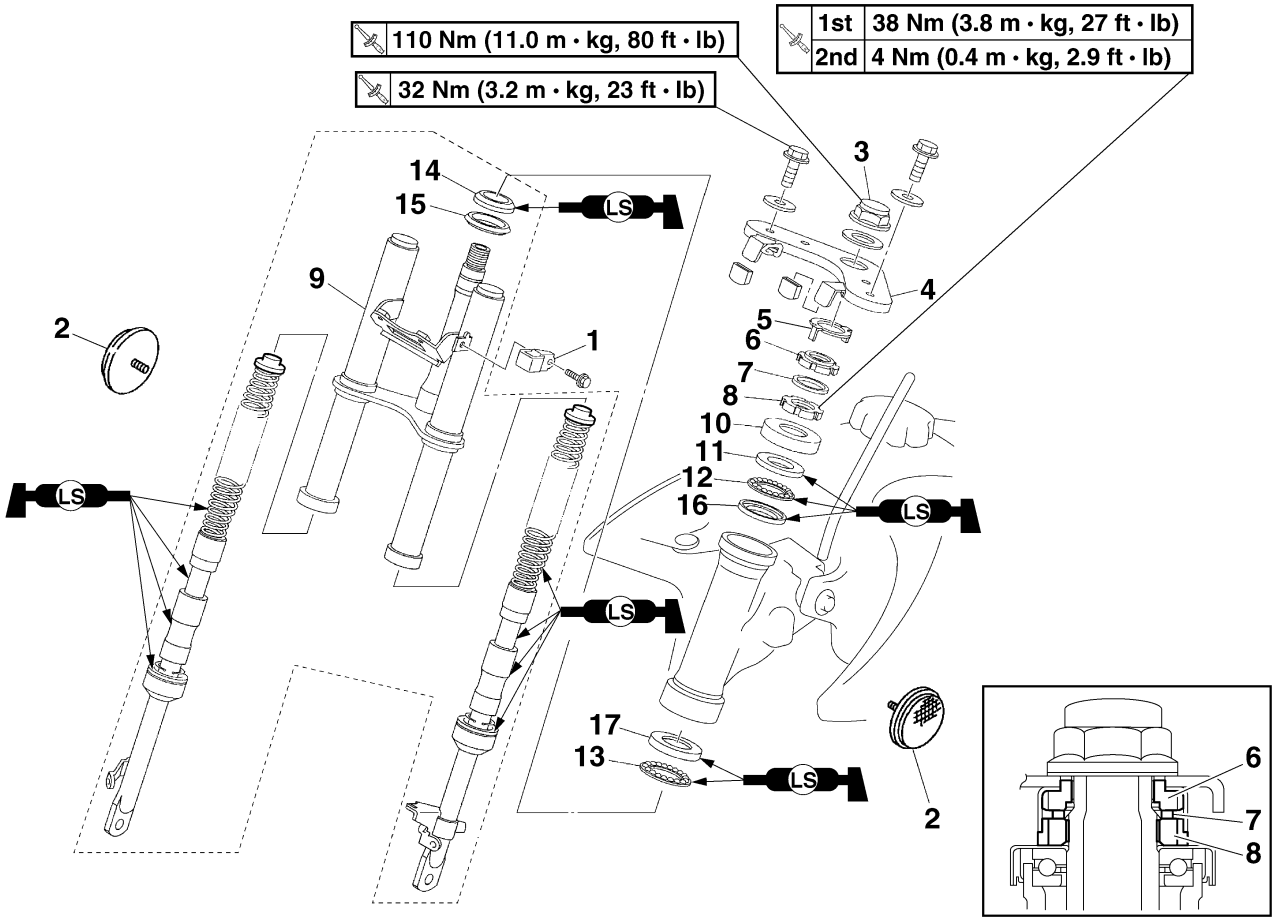
EAS23090
STEERING HEAD

Removing the front fork assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "GENERAL CHASSIS" on page 4-1.
	Front wheel		Refer to "FRONT WHEEL" on page 4-2.
	Handlebar		Refer to "HANDLEBAR" on page 4-14.
1	Front brake cable guide	1	
2	Reflector	2	For CAN
3	Steering stem nut	1	
4	Upper bracket	1	
5	Lock washer	1	
6	Upper ring nut	1	
7	Rubber washer	1	
8	Lower ring nut	1	
9	Front fork assembly	1	
10	Bearing race cover	1	
11	Upper bearing inner race	1	
12	Upper bearing	1	
13	Lower bearing	1	
14	Lower bearing inner race	1	
15	Dust seal	1	

Removing the front fork assembly



Order	Job/Parts to remove	Q'ty	Remarks
16	Upper bearing outer race	1	
17	Lower bearing outer race	1	
			For installation, reverse the removal procedure.

EAS23110
REMOVING THE LOWER BRACKET
1. Stand the vehicle on a level surface.

EWA13120
WARNING

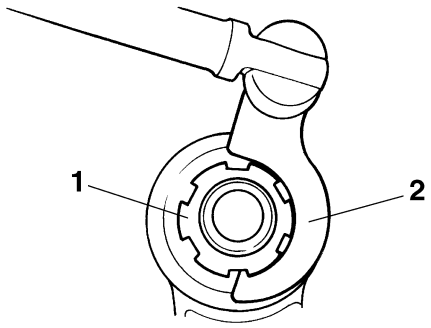
Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - Lower ring nut "1"
     (with the steering nut wrench "2")

	Steering nut wrench **90890-01403** **Exhaust flange nut wrench** **YU-A9472**

EWA13730
WARNING

Securely support the lower bracket so that there is no danger of it falling.



EAS23130
CHECKING THE STEERING HEAD
1. Wash:
   - Bearings
   - Bearing races

	Recommended cleaning solvent **Kerosene**

2. Check:
   - Bearings
   - Bearing races
     Damage/pitting → Replace.
3. Replace:
   - Bearings
   - Bearing races

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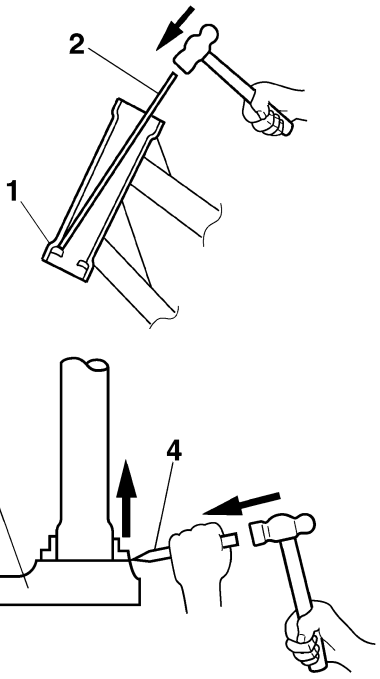
a. Remove the bearing races from the steering head pipe "1" with a long rod "2" and hammer.
b. Remove the bearing race from the lower bracket "3" with a floor chisel "4" and hammer.
c. Install new bearing races.

ECA1P6U407
NOTICE

If a bearing race is not installed properly, the steering head pipe could be damaged.

TIP
- Always replace the bearings and bearing races as a set.
- Whenever the steering head is disassembled, replace the dust seal.



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4. Check:
   - Upper bracket
   - Lower bracket
     (along with the steering stem)
     Bends/cracks/damage → Replace.

EAS23140
INSTALLING THE STEERING HEAD
1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing races

	Recommended lubricant **Lithium-soap-based grease**

2. Install:
   - Lower ring nut
   - Rubber washer
   - Upper ring nut
   - Lock washer

Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-15.

3. Install:
   - Upper bracket
   - Steering stem nut

TIP

Temporarily tighten the steering stem nut.

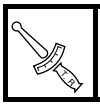
4. Install:
   - Front fork legs

   Refer to “FRONT FORK” on page 4-17.

TIP

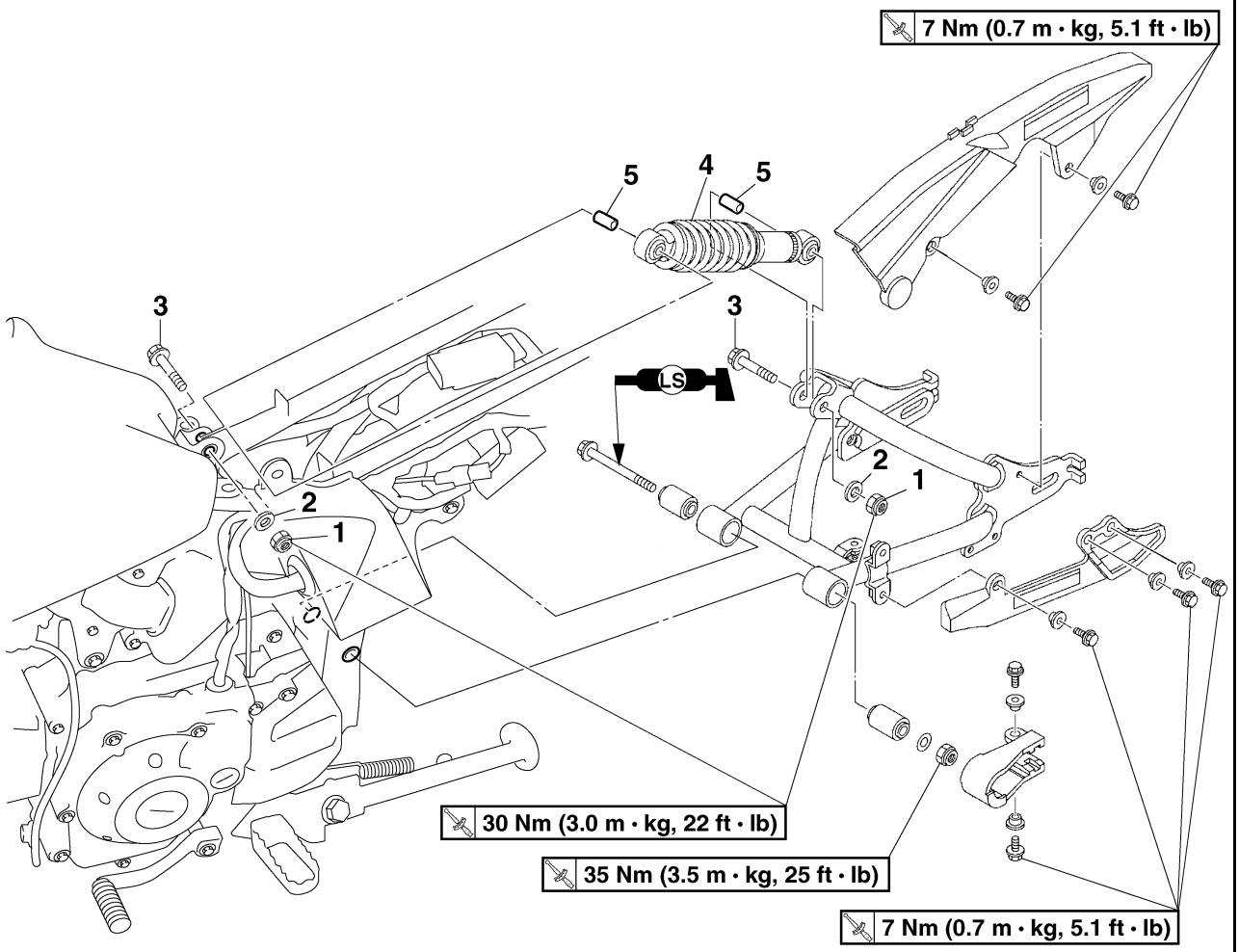
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
   - Steering stem nut

	**Steering stem nut** **110 Nm (11.0 m·kg, 80 ft·lb)**

EAS23160
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Seat assembly		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear shock absorber nut	2	
2	Washer	2	
3	Rear shock absorber bolt	2	
4	Rear shock absorber	1	
5	Spacer	2	
			For installation, reverse the removal procedure.

EAS23210
REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP
Place the vehicle on a suitable stand so that the rear wheel is elevated.

EAS23301
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
   • Rear shock absorber assembly

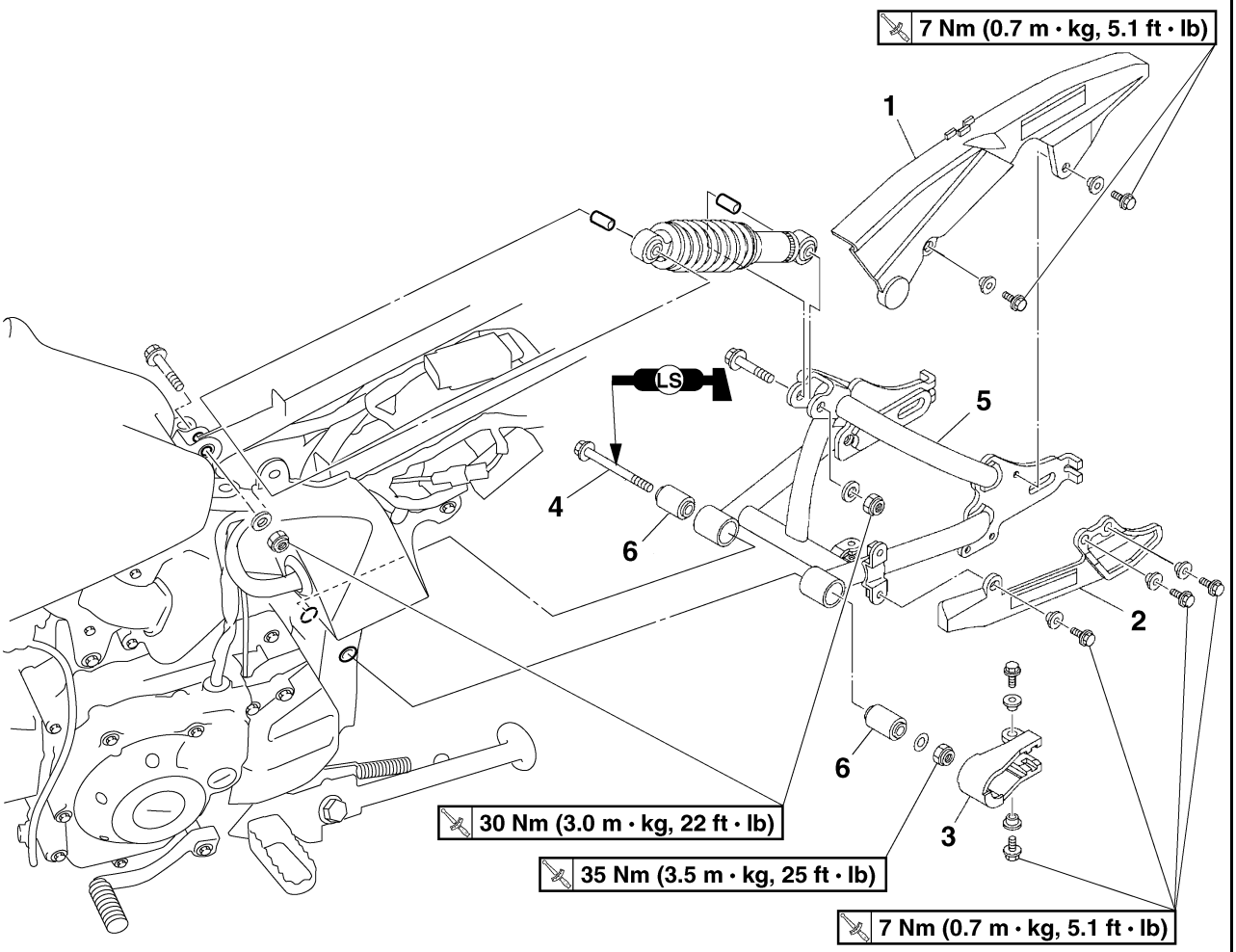
TIP
When installing the rear shock absorber assembly, lift up the swingarm.

2. Tighten:
   • Rear shock absorber assembly nuts

Rear shock absorber assembly nut
30 Nm (3.0 m·kg, 22 ft·lb)

EAS23330
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Seat assembly		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear wheel		Refer to "REAR WHEEL" on page 4-6.
	Rear shock absorber		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-23.
	Drive chain		Refer to "CHAIN DRIVE" on page 4-27.
1	Drive chain guard	1	
2	Drive chain support	1	
3	Drive chain guide	1	
4	Pivot shaft	1	
5	Swingarm	1	
6	Bushing	2	
			For installation, reverse the removal procedure.

EAS23340
REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120
⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP
Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Measure:
   • Swingarm side play
   • Swingarm vertical movement

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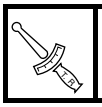
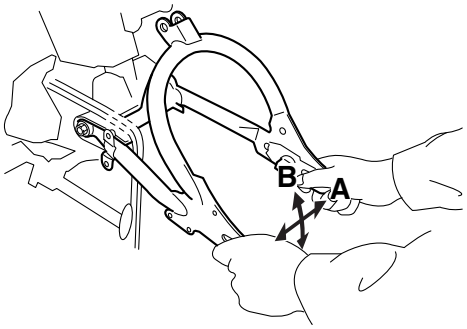
a. Measure the tightening torque of the pivot shaft nut.

	**Pivot shaft nut** **35 Nm (3.5 m·kg, 25 ft·lb)**

b. Measure the swingarm side play “A” by moving the swingarm from side to side.
c. If the swingarm side play is out of specification, check the spacers and bushings.

	**Swingarm side play (at the end of the swingarm)** **1.0 mm (0.04 in)**

d. Check the swingarm vertical movement “B” by moving the swingarm up and down.
If swingarm vertical movement is not smooth or if there is binding, check the spacers and bearings.



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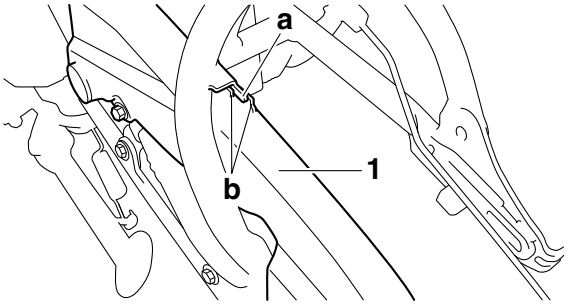
EAS23380
INSTALLING THE SWINGARM

1. Lubricate:
   • Pivot shaft

	**Recommended lubricant** **Lithium-soap-based grease**

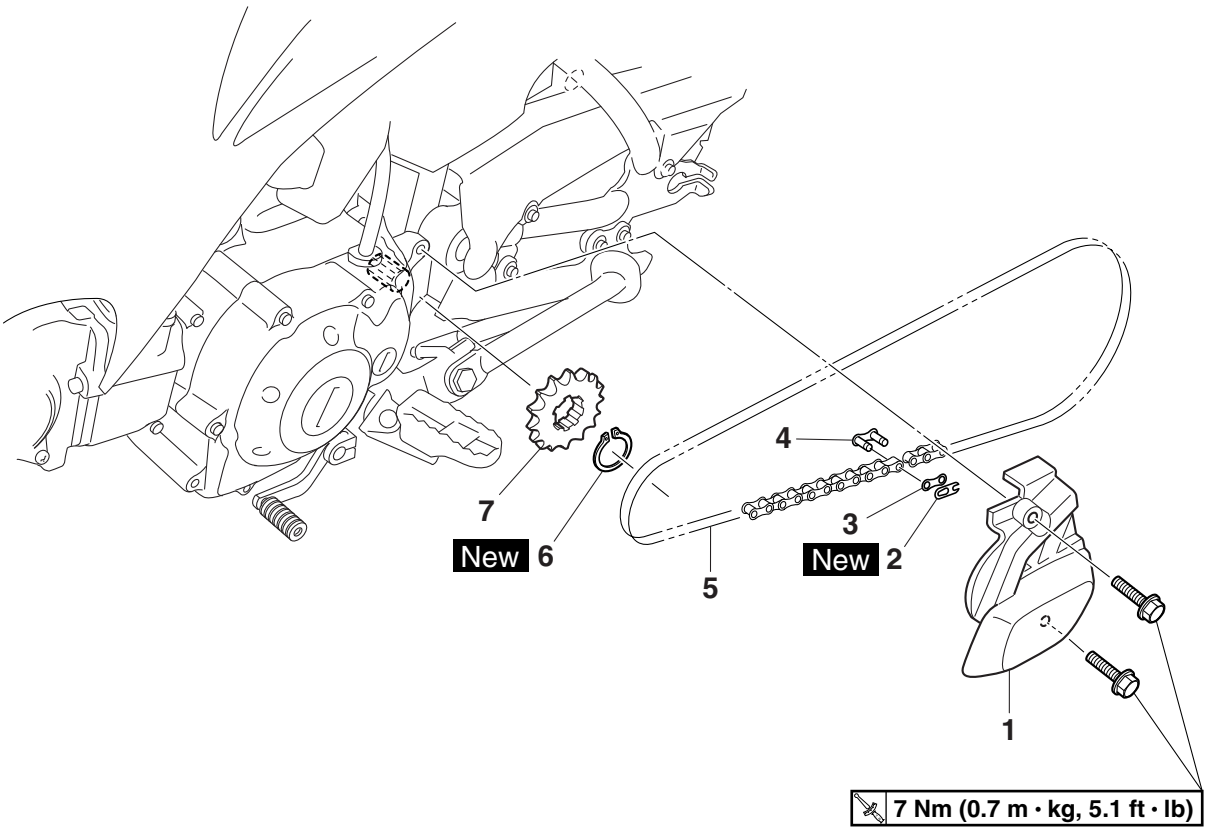
2. Install:
   • Drive chain guard “1”

TIP
Be sure to fit the projection “a” on the swingarm between the projections “b” on the drive chain guard “1”.



EAS23400
CHAIN DRIVE

Removing the drive chain



Order	Job/Parts to remove	Q'ty	Remarks
1	Drive sprocket cover	1	
2	Master link clip	1	
3	Master link plate	1	
4	Master link	1	
5	Drive chain	1	
6	Circlip	1	
7	Drive sprocket	1	
			For installation, reverse the removal procedure.

EAS23451
CHECKING THE DRIVE CHAIN

1. Measure:
   • 15-link section “a” of the drive chain
   Out of specification → Replace the drive chain.

15-link length limit
194.3 mm (7.65 in)

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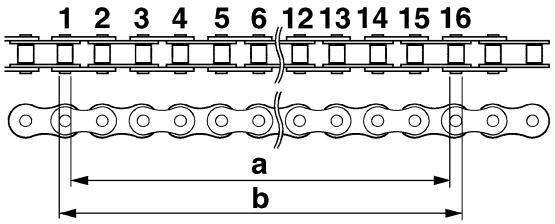
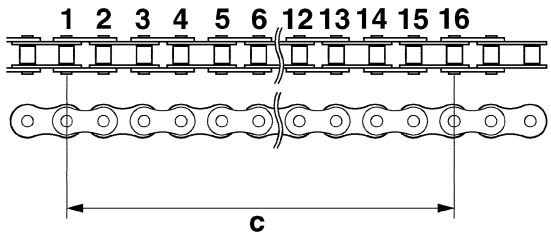
a. Measure the 15-link section “a” between the inner sides of the pins and the length “b” between the outer sides of the pins on a 15-link section of the drive chain as shown in the illustration.



b. Calculate the length “c” of the 15-link section of the drive chain using the following formula.
Drive chain 15-link section length “c” = (length “a” between pin inner sides + length “b” between pin outer sides)/2

TIP
• When measuring a 15-link section of the drive chain, make sure that the drive chain is taut.
• Perform this procedure 2–3 times, at a different location each time.



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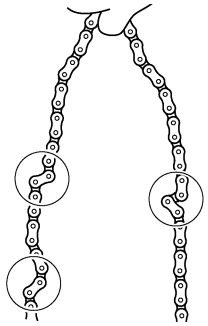
2. Check:
   • Drive chain
   Stiffness → Clean and lubricate or replace.



3. Clean:
   • Drive chain

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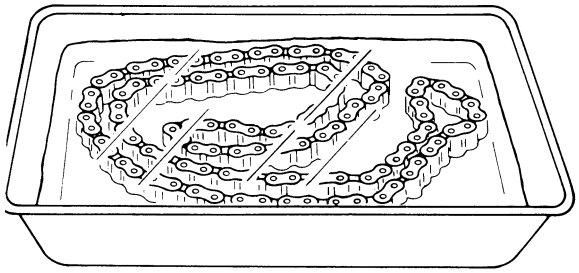
a. Wipe the drive chain with a clean cloth.
b. Put the drive chain in kerosene and remove any remaining dirt.
c. Remove the drive chain from the kerosene and completely dry it.



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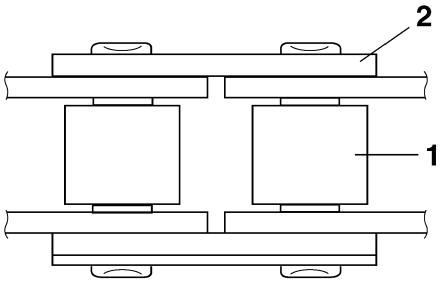
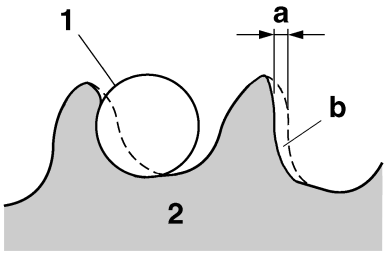
4. Check:
   • Drive chain rollers “1”
   Damage/wear → Replace the drive chain.
   • Drive chain side plates “2”
   Damage/wear/cracks → Replace the drive chain.



5. Lubricate:
   • Drive chain

Recommended lubricant
Engine oil or chain lubricant suitable for non-O-ring chains

6. Check:
   • Drive sprocket
   More than 1/4 tooth "a" wear → Replace the drive sprocket, drive chain, rear wheel sprocket as a set.
   Bent teeth → Replace the drive sprocket, drive chain, rear wheel sprocket as a set.



b. Correct

1. Drive chain roller
2. Drive chain sprocket

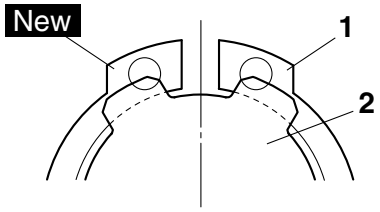
EAS23500
INSTALLING THE DRIVE CHAIN

1. Lubricate:
   • Drive chain
   • Master link New

	Recommended lubricant **Engine oil or chain lubricant suitable for non-O-ring chains**

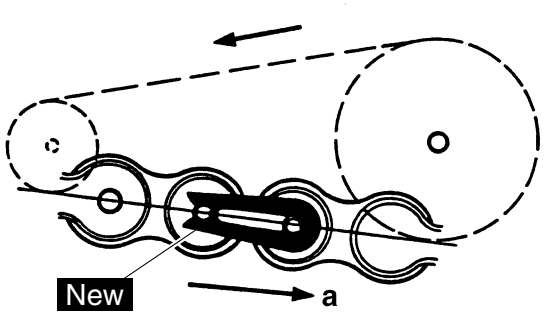
2. Install:
   • Drive sprocket
   • Circlip New

TIP
- Install the rear wheel sprocket with the gear teeth number mark facing outward.
- Align the opening between the ends of the circlip "1" with a groove in the drive axle "2".



3. Install:
   • Master link
   • Master link plate
   • Master link clip New

ECA14310
NOTICE
- **The closed end of the master link clip must face in the direction of drive chain rotation.**
- **Never install a new drive chain onto worn drive chain sprockets; this will dramatically shorten the drive chain's life.**



a. Turning direction

4. Adjust:
   • Drive chain slack
   Refer to "ADJUSTING THE DRIVE CHAIN SLACK" on page 3-14.

	Drive chain slack **35.0–45.0 mm (1.38–1.77 in)**

ECA13550
NOTICE
A drive chain that is too tight will overload the engine and other vital parts, and one that is too loose can skip and damage the swingarm or cause an accident. Therefore, keep the drive chain slack within the specified limits.

ENGINE

EAS1P6U510
ENGINE INSPECTION

EAS20710
MEASURING THE COMPRESSION PRESSURE

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   • Valve clearance
   Out of specification → Adjust.
   Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-4.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Disconnect:
   • Spark plug cap
4. Remove:
   • Spark plug

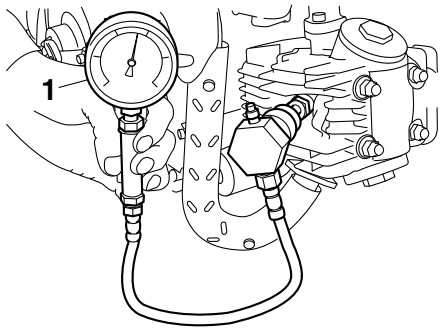
ECA1P6U311

NOTICE

Before removing a spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

5. Install:
   • Compression gauge "1"

Compression gauge
90890-03081
Engine compression tester
YU-33223



6. Measure:
   • Compression pressure
   Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1300 kPa/600 r/min (13.0 kgf/cm^2/600 r/min, 184.9 psi/600 r/min)

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a. Set the main switch to "ON".
b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

ECA1P6U312

NOTICE

Before removing a spark plug, use compressed air to blow away any dirt accumulated in the spark plug well to prevent it from falling into the cylinder.

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Piston, valves, cylinder head gasket or piston possibly defective → Repair.

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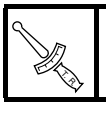
7. Install:
   • Spark plug



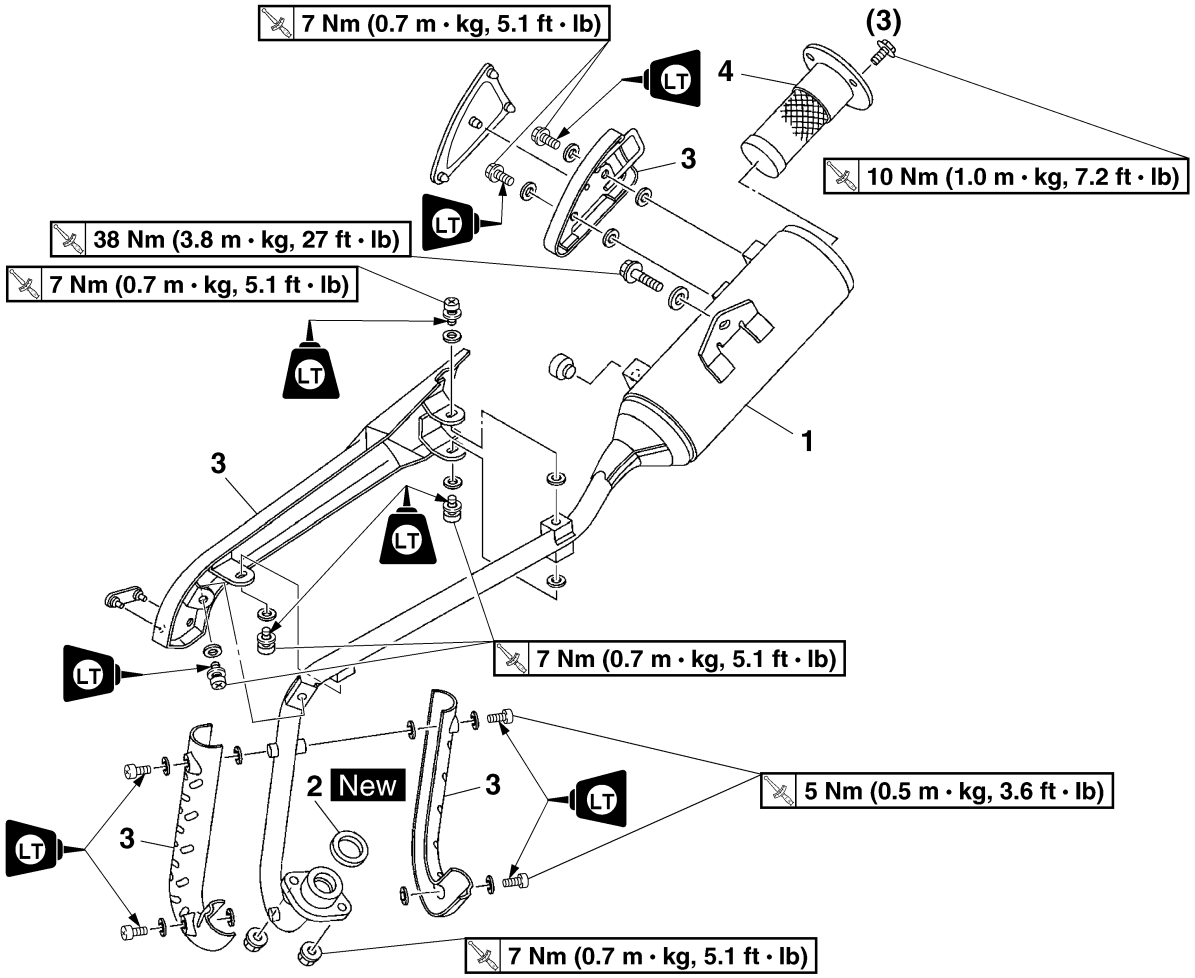
Spark plug
13 Nm (1.3 m·kg, 9.4 ft·lb)

8. Connect:
   • Spark plug cap

EAS23711

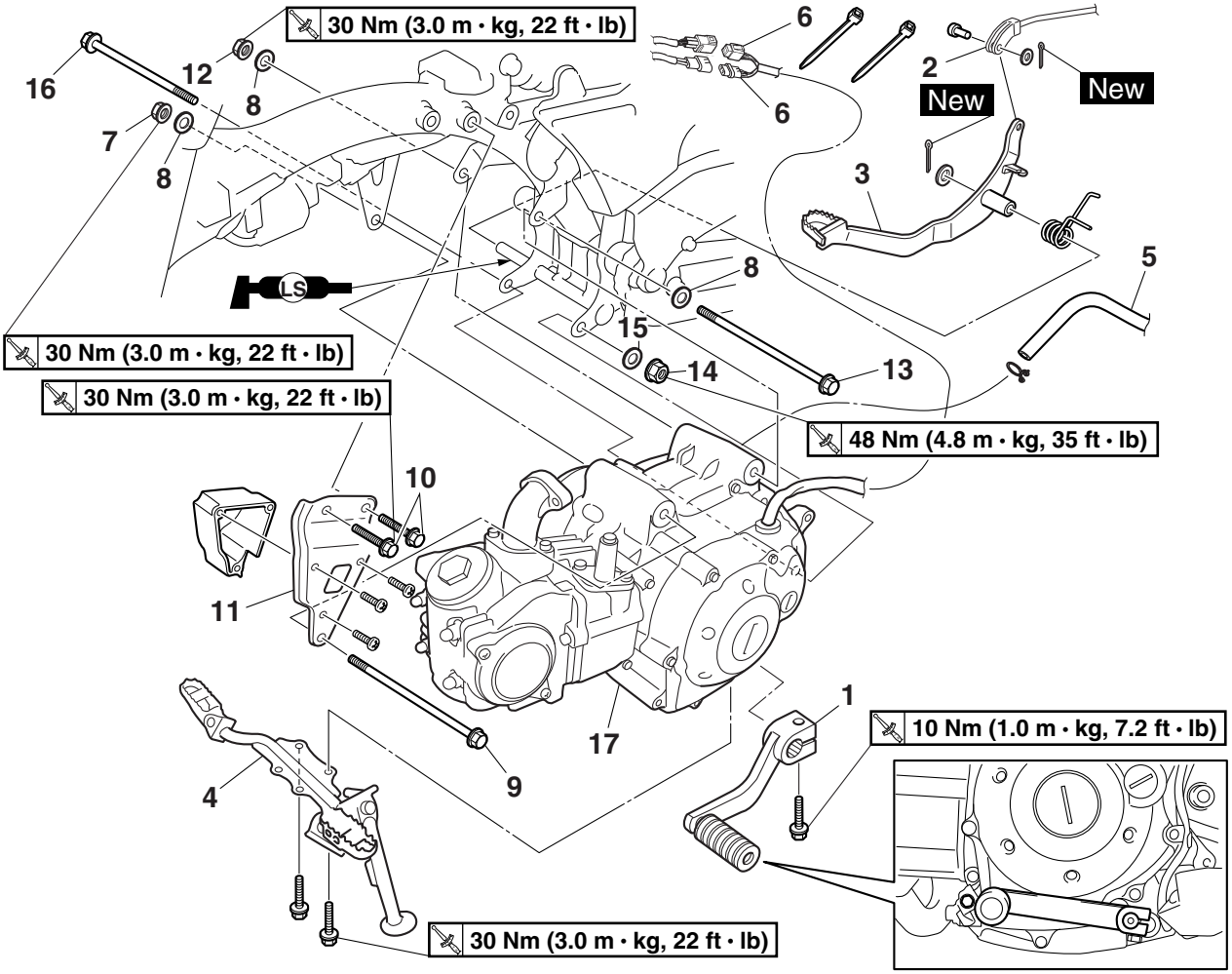
ENGINE REMOVAL

Removing the muffler



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case/Engine guard		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Drive sprocket		Refer to "CHAIN DRIVE" on page 4-27.
	Carburetor		Refer to "CARBURETOR" on page 6-3.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-27.
1	Muffler	1	
2	Gasket	1	
3	Heat protector	4	
4	Tailpipe	1	
			For installation, reverse the removal procedure.

Removing the engine

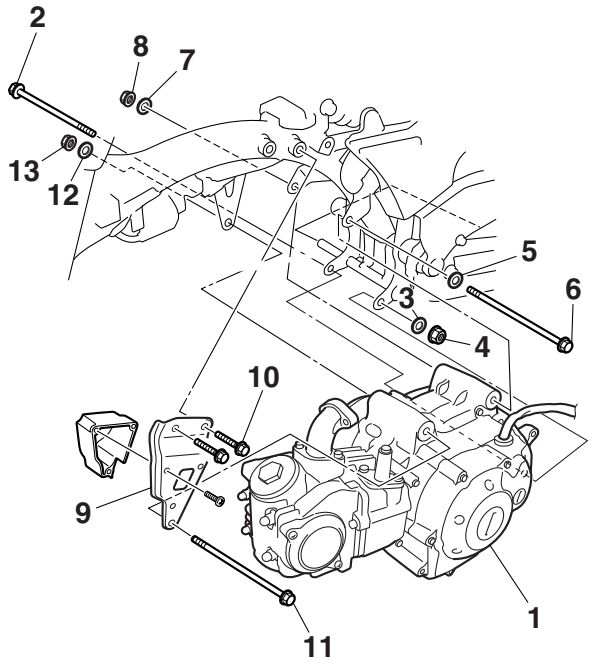


Order	Job/Parts to remove	Q'ty	Remarks
1	Shift pedal	1	
2	Rear brake rod	1	
3	Brake pedal	1	
4	Footrest assembly	1	
5	Crankcase breather hose	1	
6	Pickup coil/stator assembly coupler	2	Disconnect.
7	Engine mounting nut (front side)	1	
8	Washer	3	
9	Engine mounting bolt (front side)	1	
10	Engine bracket bolt	2	
11	Engine bracket	1	
12	Engine mounting nut (rear upper side)	1	
13	Engine mounting bolt (rear upper side)	1	
14	Engine mounting nut (rear lower side)	1	
15	Washer	1	
16	Engine mounting bolt (rear lower side)	1	
17	Engine	1	
			For installation, reverse the removal procedure.

EAS23720
INSTALLING THE ENGINE

1. Install:
   - Engine “1”
   - Engine mounting bolt (rear lower side) “2”
   - Washer “3”
   - Engine mounting nut (rear lower side) “4”
   - Washer “5”
   - Engine mounting bolt (rear upper side) “6”
   - Washer “7”
   - Engine mounting nut (rear upper side) “8”
   - Engine bracket “9”
   - Engine bracket bolts “10”
   - Engine mounting bolt (front side) “11”
   - Washer “12”
   - Engine mounting nut (front side) “13”

TIP
Do not fully tighten the bolts and nuts.

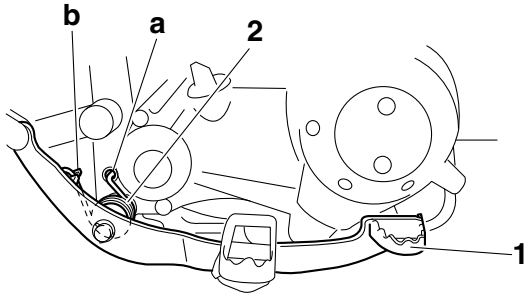


2. Tighten:
   - Engine mounting nut (rear lower side) “4”
   - Engine mounting nut (rear upper side) “8”
   - Engine bracket bolts “10”
   - Engine mounting nut (front side) “13”

Engine mounting nut (rear lower side)
48 Nm (4.8 m·kg, 35 ft·lb)
Engine mounting nut (rear upper side)
30 Nm (3.0 m·kg, 22 ft·lb)
Engine bracket bolt
30 Nm (3.0 m·kg, 22 ft·lb)
Engine mounting nut (front side)
30 Nm (3.0 m·kg, 22 ft·lb)

3. Install:
   - Brake pedal “1”

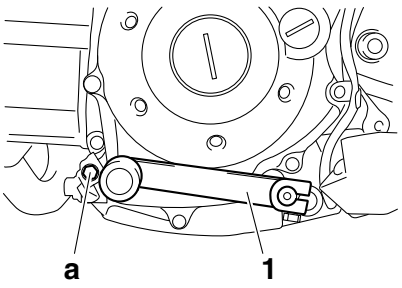
TIP
Insert the straight end of the spring “2” into the hole “a” in the frame and hook the curved end onto the spring hook “b” on the brake pedal.



4. Install:
   - Shift pedal “1”

TIP
Center the end of the shift pedal to the AC magneto cover bolt “a”, and then slightly rotate the pedal clockwise and install it at the position where grooves in the pedal hole first align with the splines on the shift shaft.

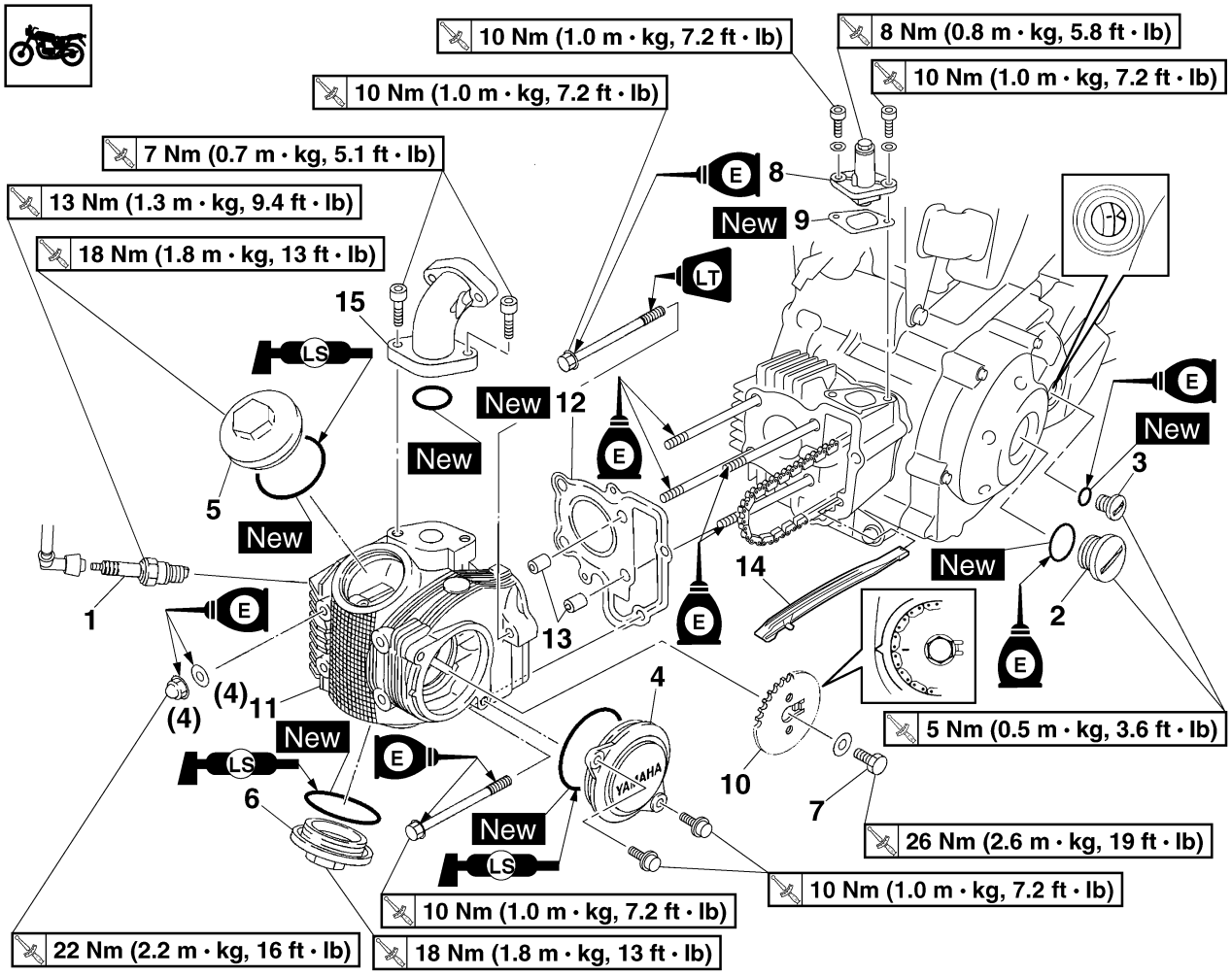
Shift pedal bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)



EAS24100

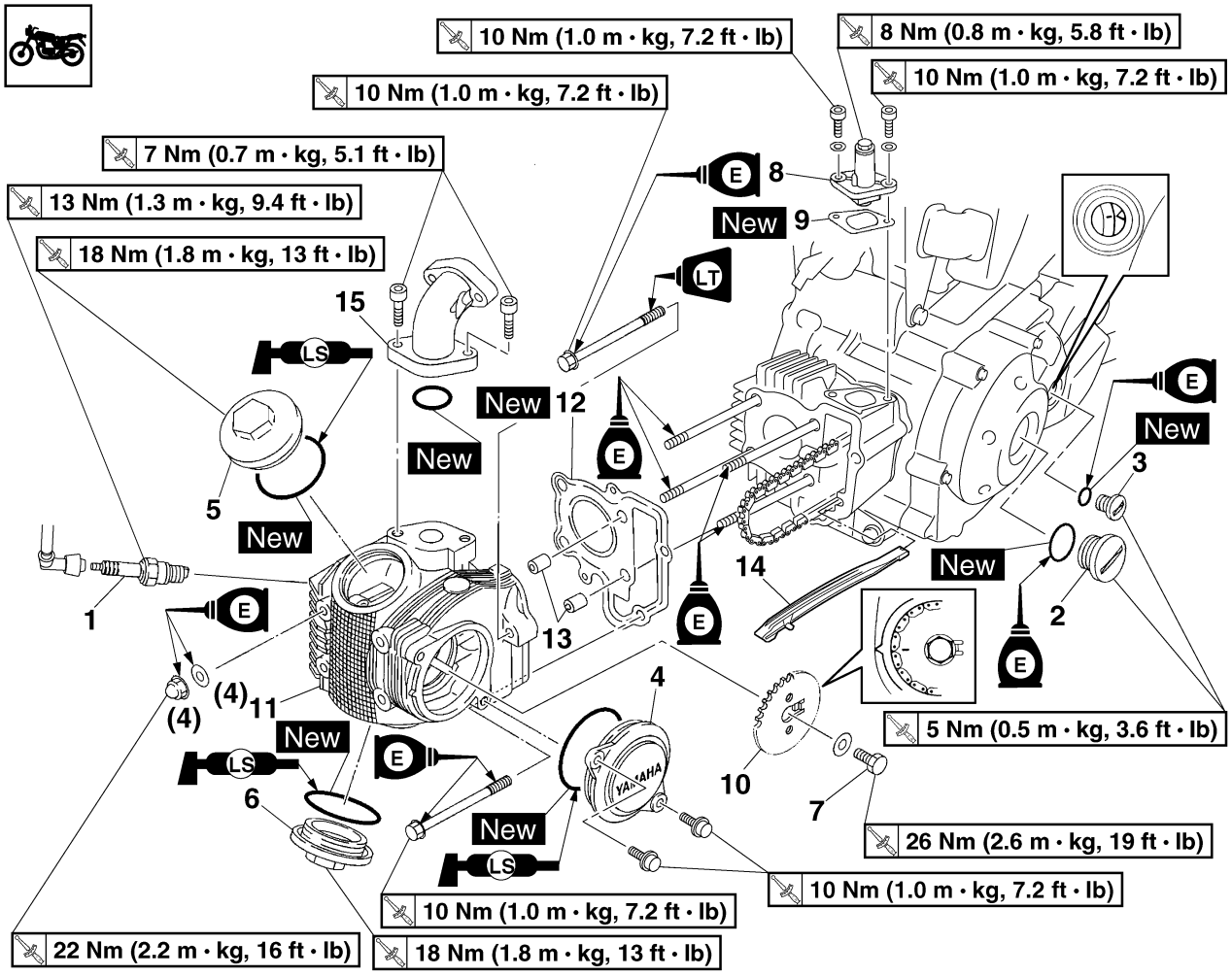
CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
	Muffler		Refer to "ENGINE REMOVAL" on page 5-2.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Carburetor		Refer to "CARBURETOR" on page 6-3.
	Front wheel		Refer to "FRONT WHEEL" on page 4-2.
1	Spark plug	1	
2	Crankshaft end cover	1	
3	Timing mark accessing screw	1	
4	Camshaft sprocket cover	1	
5	Intake tappet cover	1	
6	Exhaust tappet cover	1	
7	Camshaft sprocket bolt	1	
8	Timing chain tensioner	1	
9	Timing chain tensioner gasket	1	
10	Camshaft sprocket	1	
11	Cylinder head	1	
12	Cylinder head gasket	1	
13	Dowel pin	2	
14	Timing chain guide (exhaust side)	1	

Removing the cylinder head



Order	Job/Parts to remove	Q'ty	Remarks
15	Intake manifold	1	
			For installation, reverse the removal procedure.

EAS24130
REMOVING THE CYLINDER HEAD

1. Align:
   • "I" mark "a" on the AC magneto rotor
   (with the stationary pointer "b" on the AC magneto cover)

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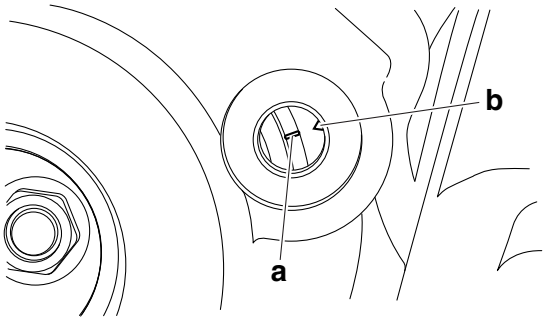
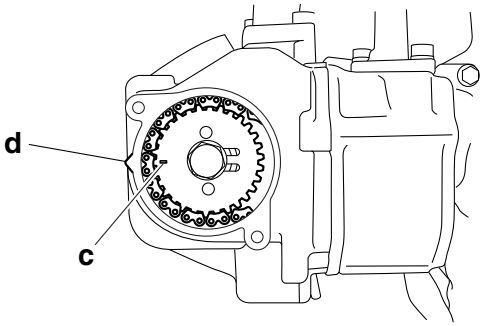
a. Turn the crankshaft counterclockwise.
b. When the piston is at TDC on the compression stroke, align the "I" mark "c" on the camshaft sprocket with the stationary pointer "d" on the cylinder head.





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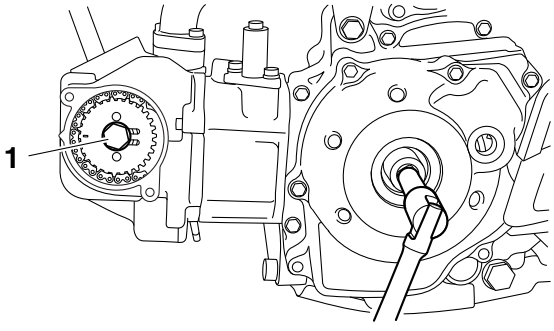
2. Loosen:
   • Camshaft sprocket bolt "1"

TIP
While holding the AC magneto rotor nut with a wrench, remove the camshaft sprocket bolt.

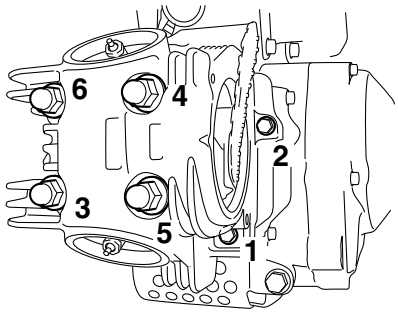


3. Remove:
   • Timing chain tensioner
   (along with the gasket)
   • Camshaft sprocket

TIP
To prevent the timing chain from falling into the crankcase, fasten it with a wire.

4. Remove:
   • Cylinder head

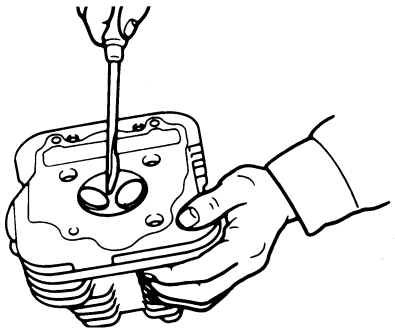
TIP
• Loosen the bolts and nuts in the proper sequence as shown.
• Loosen each bolt and nut 1/2 of a turn at a time. After all of the nuts are fully loosened, remove them.



EAS24160
CHECKING THE CYLINDER HEAD

1. Eliminate:
   • Combustion chamber carbon deposits
   (with a rounded scraper)

TIP
Do not use a sharp instrument to avoid damaging or scratching:
• Spark plug bore threads
• Valve seats



2. Check:
   • Cylinder head
   Damage/scratches → Replace.
3. Measure:
   • Cylinder head warpage
   Out of specification → Resurface the cylinder head.

	Warpage limit **0.05 mm (0.0020 in)**

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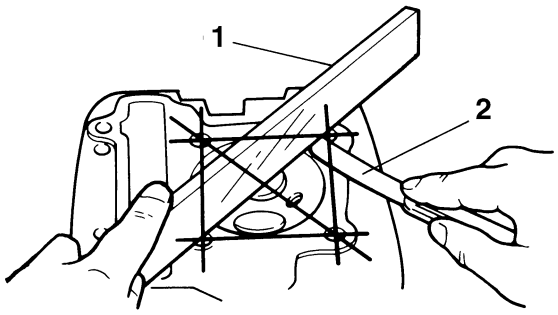
a. Place a straightedge "1" and a thickness gauge "2" across the cylinder head.



b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

To ensure an even surface, rotate the cylinder head several times.

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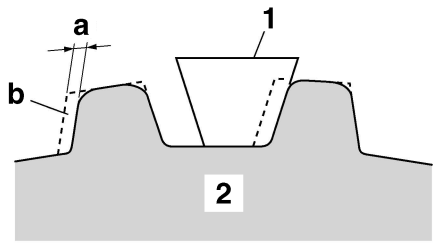
EAS24180

CHECKING THE CAMSHAFT SPROCKET AND TIMING CHAIN GUIDES

1. Check:
   • Camshaft sprocket
   More than 1/4 tooth wear "a" → Replace the camshaft sprocket, timing chain, and crankshaft as a set.



b. Correct

1. Timing chain roller
2. Camshaft sprocket

2. Check:
   • Timing chain guide (exhaust side)
   • Timing chain guide (intake side)
   Damage/wear → Replace the defective part(s).

EAS24190

CHECKING THE TIMING CHAIN TENSIONER

1. Check:
   • Timing chain tensioner
   Cracks/damage → Replace.
2. Check:
   • One-way cam operation
   Rough movement → Replace the timing chain tensioner housing.
3. Check:
   • Cap bolt
   • Copper washer
   • Spring
   • One-way cam
   • Timing chain tensioner rod
   Damage/wear → Replace the defective part(s).

EAS24230

INSTALLING THE CYLINDER HEAD

1. Tighten:
   • Cylinder head nuts

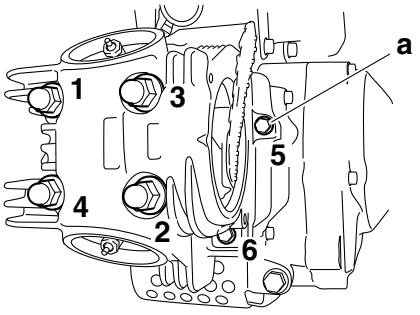
	Cylinder head nut **22 Nm (2.2 m·kg, 16 ft·lb)**

   • Cylinder head bolts

	Cylinder head bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

TIP

- Lubricate the cylinder head bolts, nuts, and copper washers with engine oil.
- Apply locking agent (LOCTITE®) to the threads of the bolt "a".
- Tighten the cylinder head nuts and bolts in the proper tightening sequence as shown and torque them in two stages.



2. Install:
   • Camshaft sprocket

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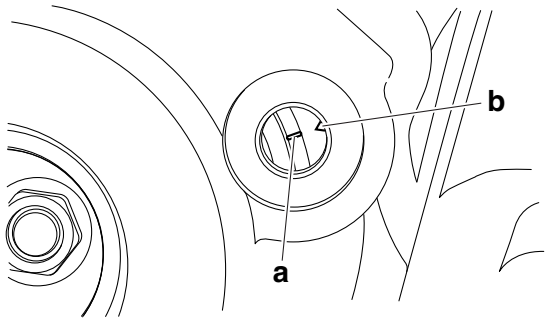
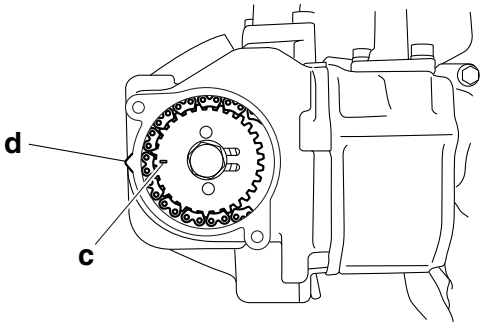
a. Turn the crankshaft counterclockwise.
b. Align the "I" mark "a" on the AC magneto rotor with the stationary pointer "b" on the AC mag-

neto cover.



c. Align the "I" mark "c" on the camshaft sprocket with the stationary pointer "d" on the cylinder head.



d. Install the timing chain onto the camshaft sprocket, and then install the camshaft sprocket onto the camshaft.

TIP

When installing the camshaft sprocket, be sure to keep the timing chain as tight as possible on the exhaust side.

ECA1P6U508

NOTICE

Do not turn the crankshaft when installing the camshaft sprocket to avoid damage or improper valve timing.

e. While holding the camshaft, temporarily tighten the camshaft sprocket bolt.
f. Remove the wire from the timing chain.

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3. Install:
   • Timing chain tensioner

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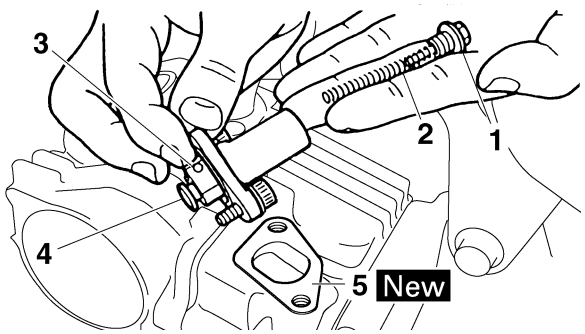
a. Remove the timing chain tensioner cap bolt "1" and spring "2".
b. Release the timing chain tensioner one-way cam "3" and push the timing chain tensioner rod "4" all the way into the timing chain tensioner housing.
c. Install the timing chain tensioner and a new gasket "5" onto the cylinder.

	Timing chain tensioner bolt 10 Nm (1.0 m·kg, 7.2 ft·lb)

d. Install the spring "2" and timing chain tensioner cap bolt "1".

	Timing chain tensioner cap bolt 8 Nm (0.8 m·kg, 5.8 ft·lb)



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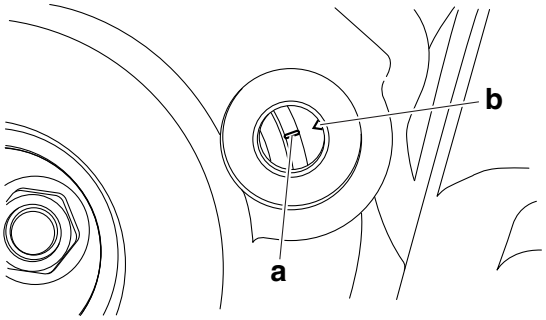
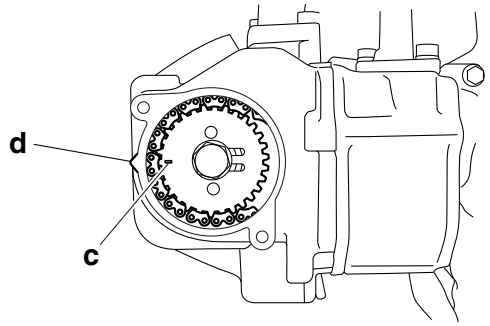
4. Turn:
   • Crankshaft
   (several turns counterclockwise)
5. Check:
   • "I" mark "a"
   Align the "I" mark on the AC magneto rotor with the stationary pointer "b" on the AC magneto cover.
   • "I" mark "c"
   Align the "I" mark on the camshaft sprocket with the stationary pointer "d" on the cylinder head.
   Out of alignment → Correct.
   Refer to the installation steps above.





6. Tighten:
   • Camshaft sprocket bolt

	Camshaft sprocket bolt **26 Nm (2.6 m·kg, 19 ft·lb)**

ECA1P6U509

NOTICE

Be sure to tighten the camshaft sprocket bolt to the specified torque to avoid the possibility of the bolt coming loose and damaging the engine.

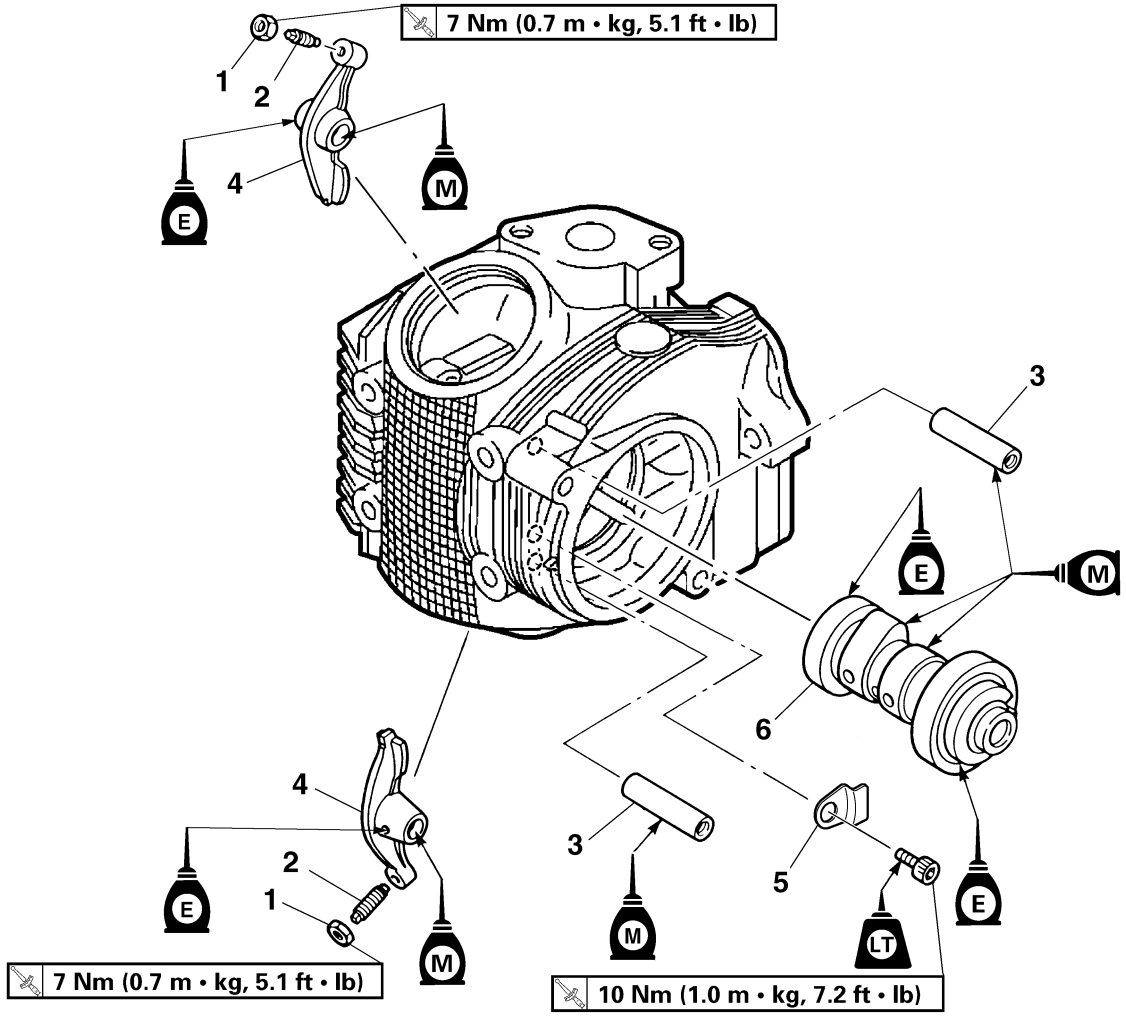
TIP

While holding the AC magneto rotor nut with a wrench, tighten the camshaft sprocket bolt.

7. Measure:
   • Valve clearance
   Out of specification → Adjust.
   Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-4.

EAS23730
CAMSHAFT

Removing the rocker arms and camshaft



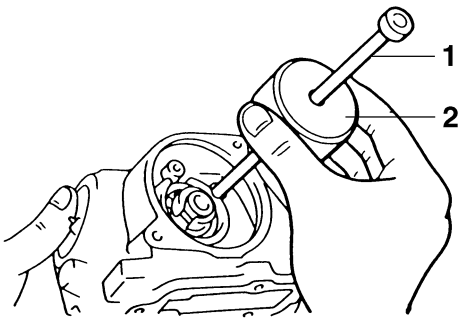
Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-5.
1	Locknut	2	
2	Valve clearance adjusting screw	2	
3	Rocker arm shaft	2	
4	Rocker arm	2	
5	Camshaft retainer	1	
6	Camshaft	1	
			For installation, reverse the removal procedure.

EAS23770
REMOVING THE ROCKER ARMS AND CAMSHAFT

1. Remove:
   • Rocker arm shafts
   • Rocker arms

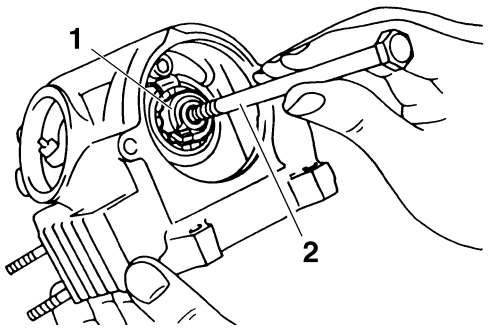
TIP
Remove the rocker arm shafts with the slide hammer bolt "1" and weight "2".

Slide hammer bolt
90890-01083
Slide hammer bolt 6 mm
YU-01083-1
Weight
90890-01084
YU-01083-3



2. Remove:
   • Camshaft "1"

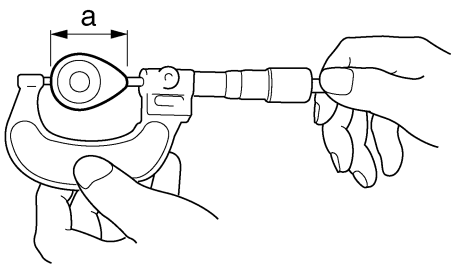
TIP
Screw 8-mm bolt "2" into the threaded end of the camshaft and then pull out the camshaft.

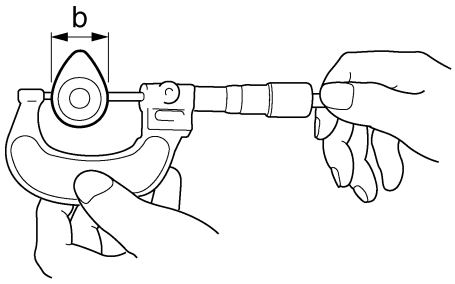


EAS23840
CHECKING THE CAMSHAFT

1. Check:
   • Camshaft lobes
   Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   • Camshaft lobe dimensions "a" and "b"
   Out of specification → Replace the camshaft.

Camshaft lobe dimensions
Intake A
25.428–25.528 mm (1.0011–1.0050 in)
Limit
25.328 mm (0.9972 in)
Intake B
21.034–21.134 mm (0.8281–0.8320 in)
Limit
20.934 mm (0.8242 in)
Exhaust A
25.286–25.386 mm (0.9955–0.9994 in)
Limit
25.186 mm (0.9916 in)
Exhaust B
21.047–21.147 mm (0.8286–0.8326 in)
Limit
20.947 mm (0.8247 in)





3. Check:
   • Camshaft oil passage
   Obstruction → Blow out with compressed air.

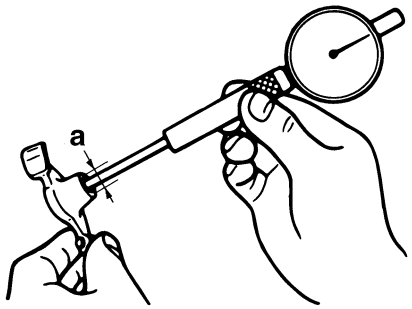
EAS23880
CHECKING THE ROCKER ARMS AND ROCKER ARM SHAFTS

The following procedure applies to all of the rocker arms and rocker arm shafts.

1. Check:
   • Rocker arm
   Damage/wear → Replace.

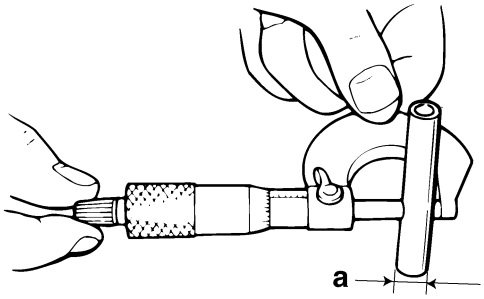
2. Check:
   • Rocker arm shaft
   Blue discoloration/excessive wear/pitting/scratches → Replace or check the lubrication system.
3. Measure:
   • Rocker arm inside diameter “a”
   Out of specification → Replace.

Rocker arm inside diameter
10.000–10.015 mm (0.3937–0.3943 in)
Limit
10.025 mm (0.3947 in)



4. Measure:
   • Rocker arm shaft outside diameter “a”
   Out of specification → Replace.

Rocker arm shaft outside diameter
9.981–9.991 mm (0.3930–0.3933 in)
Limit
9.976 mm (0.3928 in)



5. Calculate:
   • Rocker-arm-to-rocker-arm-shaft clearance

TIP
Calculate the clearance by subtracting the rocker arm shaft outside diameter from the rocker arm inside diameter.

Out of specification → Replace the defective part(s).

Rocker-arm-to-rocker-arm-shaft clearance
0.009–0.034 mm (0.0004–0.0013 in)
Limit
0.049 mm (0.0019 in)

EAS24040
INSTALLING THE CAMSHAFT AND ROCKER ARMS

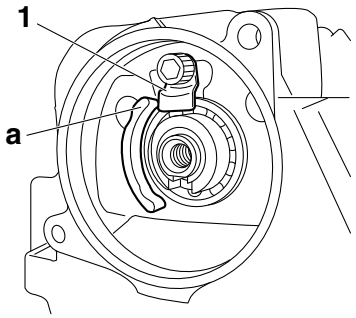
1. Lubricate:
   • Camshaft

Recommended lubricant
Camshaft
Molybdenum disulfide oil
Camshaft bearing
Engine oil

2. Install:
   • Camshaft retainer “1”

Camshaft retainer bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)
LOCTITE®

TIP
When installing the camshaft retainer, make sure it touches the rib “a” on the cylinder head.



3. Lubricate:
   • Rocker arms
   • Rocker arm shafts

Recommended lubricant
Rocker arm inner surface and rocker arm shaft
Molybdenum disulfide oil
Rocker arm hole
Engine oil

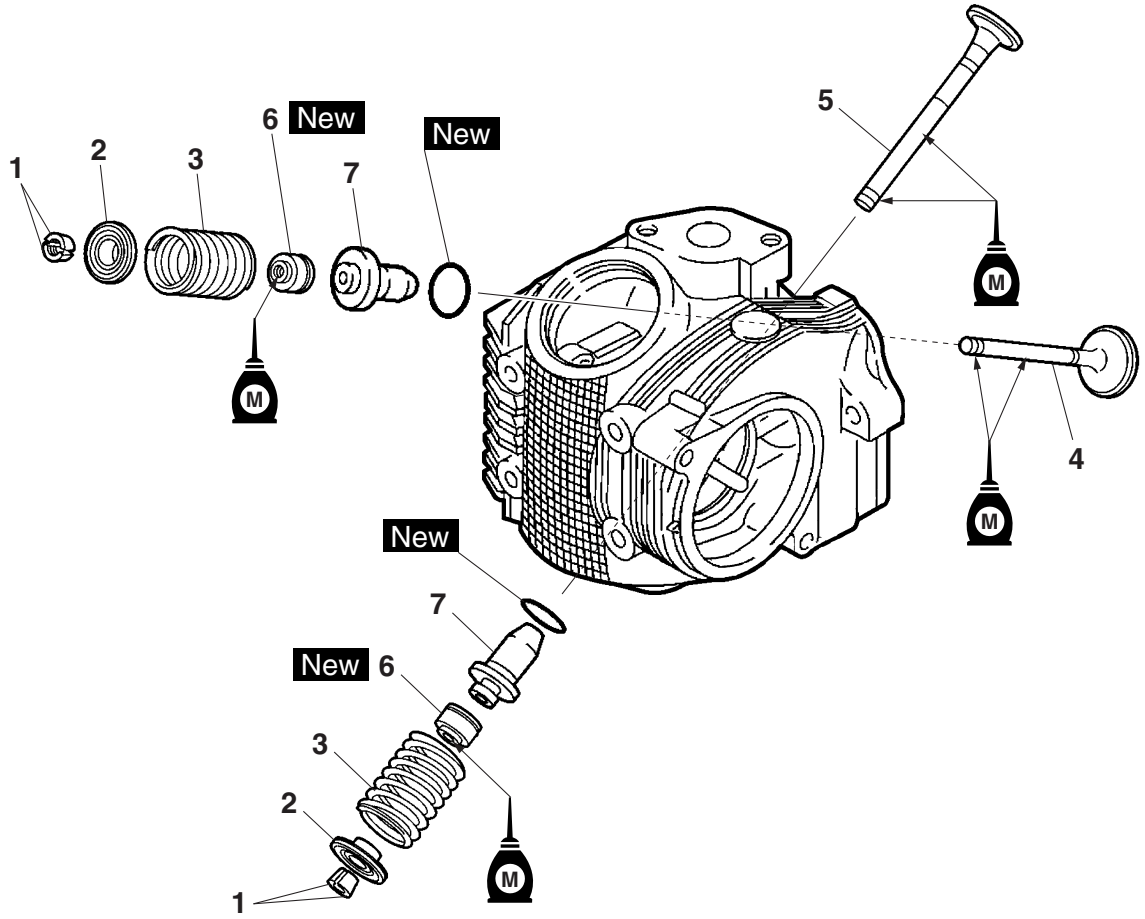
4. Install:
   • Rocker arms
   • Rocker arm shafts

TIP
Make sure the rocker arm shafts are completely

pushed into the cylinder head.

EAS24270
VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-5.
	Rocker arms/Camshaft		Refer to "CAMSHAFT" on page 5-11.
1	Valve cotter	4	
2	Valve spring seat	2	
3	Valve spring	2	
4	Intake valve	1	
5	Exhaust valve	1	
6	Valve stem seal	2	
7	Valve guide	2	
			For installation, reverse the removal procedure.

EAS24280
REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to "CHECKING THE VALVE SEATS" on page 5-18.

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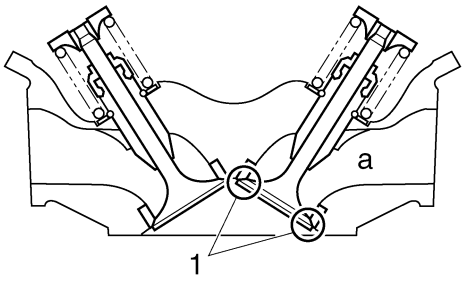
a. Pour a clean solvent "a" into the intake and exhaust ports.
b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat "1".



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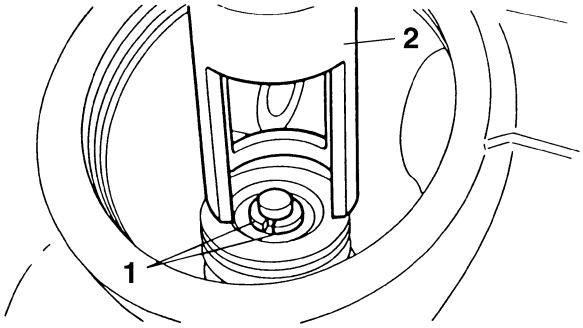
2. Remove:
   - Valve cotters "1"

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment "2".

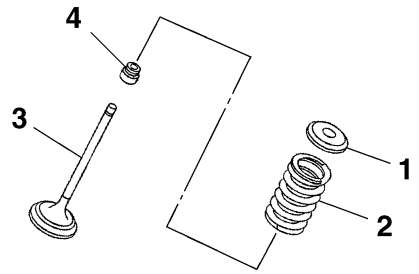
Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108



3. Remove:
   - Valve spring seat "1"
   - Valve spring "2"
   - Valve "3"
   - Valve stem seal "4"

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



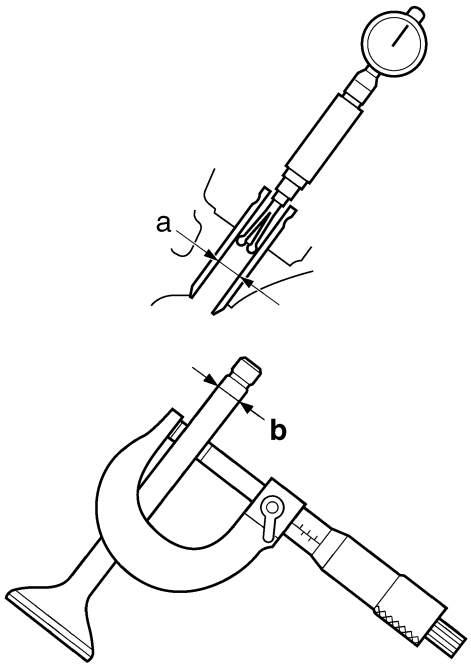
EAS24290
CHECKING THE VALVES AND VALVE GUIDES

The following procedure applies to all of the valves and valve guides.

1. Measure:
   - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve guide.

- Valve-stem-to-valve-guide clearance = Valve guide inside diameter "a" - Valve stem diameter "b"

Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.025–0.052 mm (0.0010–0.0020 in)
Limit
0.100 mm (0.0039 in)



2. Replace:
   • Valve guide

TIP
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

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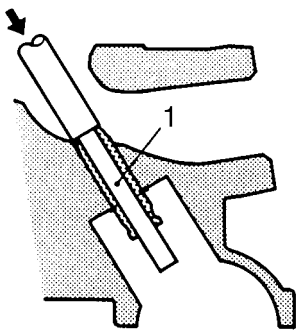
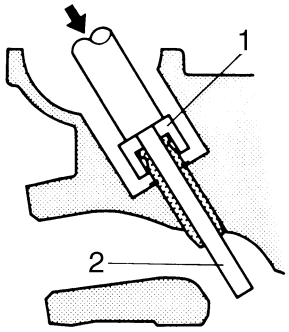
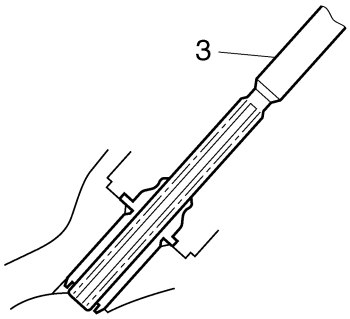
a. Remove the valve guide with the valve guide remover "1".



b. Install the new valve guide with the valve guide installer "1" and valve guide remover "2".



c. After installing the valve guide, bore the valve guide with the valve guide reamer "3" to obtain the proper valve-stem-to-valve-guide clearance.



TIP
After replacing the valve guide, reface the valve seat.

Valve guide remover (ø4.5)
90890-04116
Valve guide remover (4.5 mm)
YM-04116
Valve guide installer (ø4.5)
90890-04117
Valve guide installer (4.5 mm)
YM-04117
Valve guide reamer (ø4.5)
90890-04118
Valve guide reamer (4.5 mm)
YM-04118

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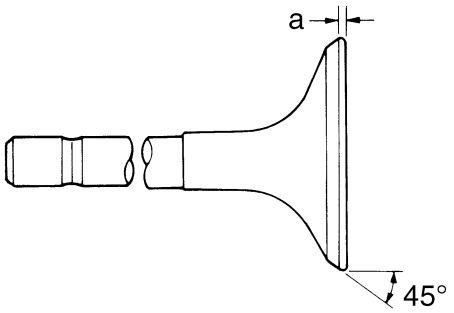
3. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
4. Check:
   • Valve face
   Pitting/wear → Grind the valve face.
   • Valve stem end
   Mushroom shape or diameter larger than the

body of the valve stem → Replace the valve.
5. Measure:
   • Valve margin thickness "a"
   Out of specification → Replace the valve.

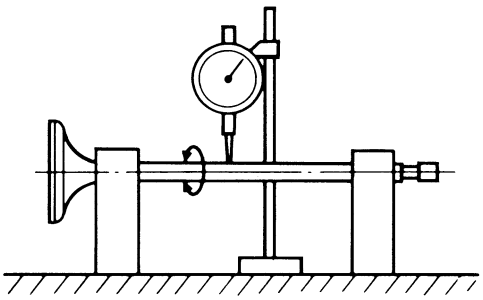
Valve margin thickness D (intake)
0.50–0.90 mm (0.0197–0.0354 in)
Valve margin thickness D (exhaust)
0.50–0.90 mm (0.0197–0.0354 in)



6. Measure:
   • Valve stem runout
   Out of specification → Replace the valve.

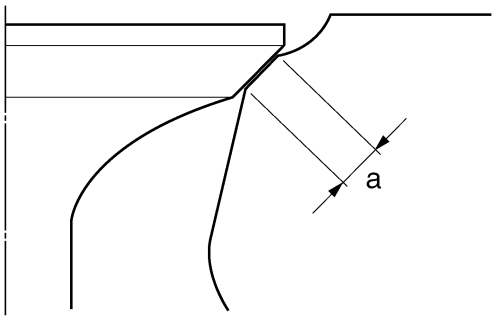
TIP
- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the oil seal.

Valve stem runout
0.010 mm (0.0004 in)



EAS24300
CHECKING THE VALVE SEATS
The following procedure applies to all of the valves and valve seats.
1. Eliminate:
   • Carbon deposits
   (from the valve face and valve seat)
2. Check:
   • Valve seat
   Pitting/wear → Replace the cylinder head.
3. Measure:
   • Valve seat width "a"
   Out of specification → Replace the cylinder head.

Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)
Limit
1.6 mm (0.06 in)



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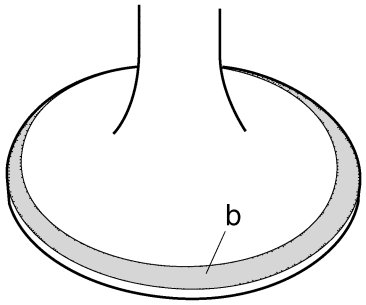
a. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
d. Measure the valve seat width.

TIP
Where the valve seat and valve face contacted one another, the blueing will have been removed.

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4. Lap:
   • Valve face
   • Valve seat

TIP
After replacing the cylinder head or replacing the

valve and valve guide, the valve seat and valve face should be lapped.

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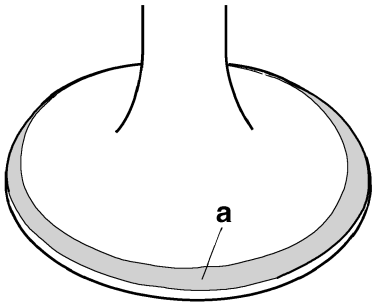
a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

NOTICE

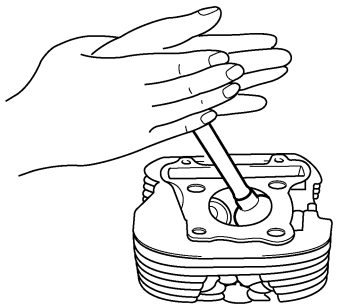
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



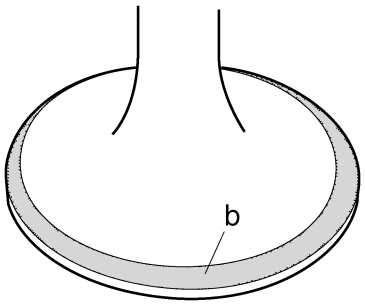
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

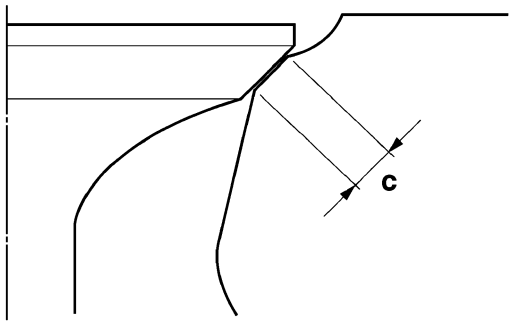
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



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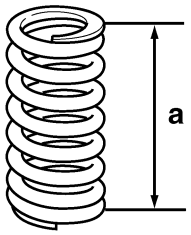
EAS24310

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

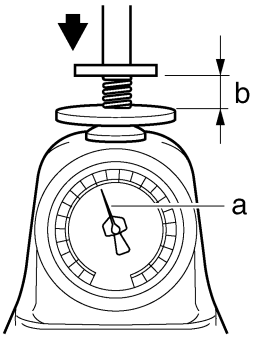
1. Measure:
   • Valve spring free length "a"
   Out of specification → Replace the valve spring.

Free length (intake)
32.45 mm (1.28 in)
Limit
30.83 mm (1.21 in)
Free length (exhaust)
32.45 mm (1.28 in)
Limit
30.83 mm (1.21 in)



2. Measure:
   • Compressed valve spring force “a”
   Out of specification → Replace the valve spring.

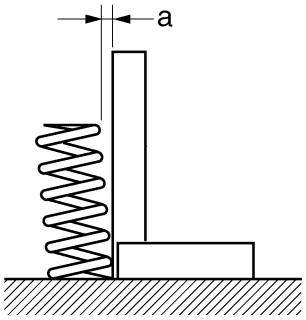
Installed compression spring force (intake)
138.00–158.00 N (14.07–16.11 kgf, 31.02–35.52 lbf)
Installed compression spring force (exhaust)
138.00–158.00 N (14.07–16.11 kgf, 31.02–35.52 lbf)
Installed length (intake)
24.20 mm (0.95 in)
Installed length (exhaust)
24.20 mm (0.95 in)



b. Installed length

3. Measure:
   • Valve spring tilt “a”
   Out of specification → Replace the valve spring.

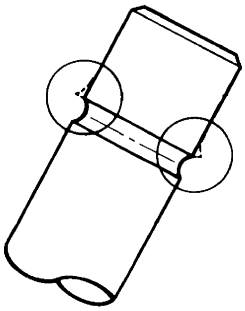
Spring tilt (intake)
1.4 mm (0.06 in)
Spring tilt (exhaust)
1.4 mm (0.06 in)



EAS24340
INSTALLING THE VALVES

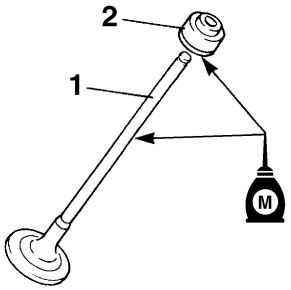
The following procedure applies to all of the valves and related components.

1. Deburr:
   • Valve stem end
   (with an oil stone)



2. Lubricate:
   • Valve stem “1”
   • Valve stem seal “2”
   (with the recommended lubricant)

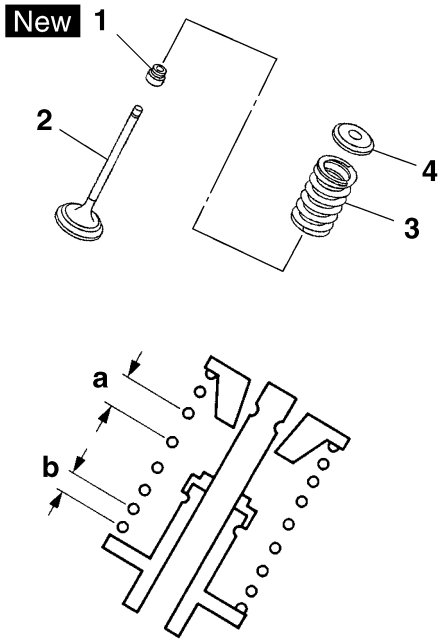
Recommended lubricant
Molybdenum disulfide oil



3. Install:
   • Valve stem seal “1” New
   • Valve “2”
   • Valve spring “3”
   • Valve spring seat “4”

TIP
- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a”

facing up.



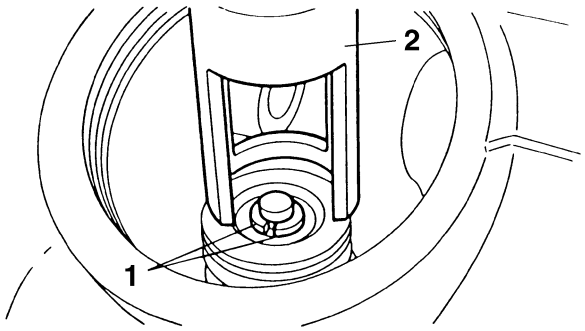
b. Smaller pitch

4. Install:
   • Valve cotters “1”

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor and the valve spring compressor attachment “2”.

Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04108
Valve spring compressor adapter 22 mm
YM-04108

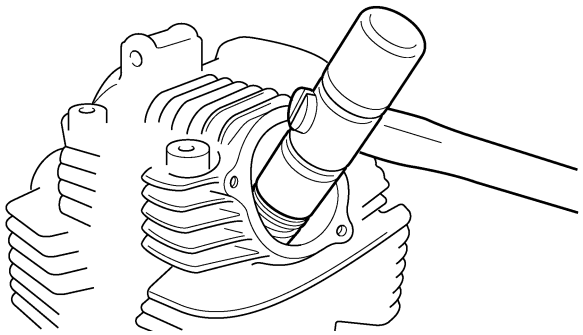


5. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

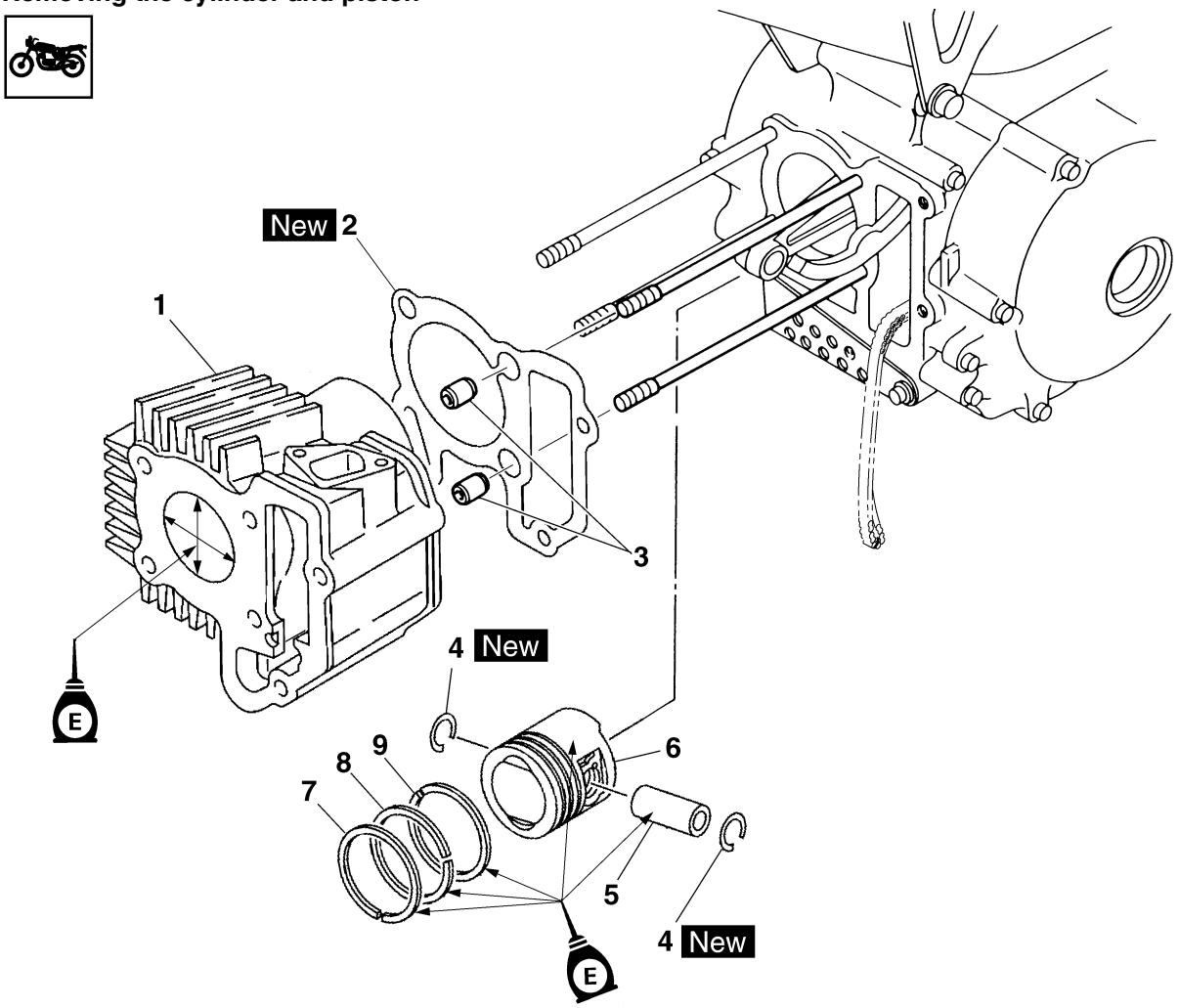
NOTICE

Hitting the valve tip with excessive force could damage the valve.



EAS24350
CYLINDER AND PISTON

Removing the cylinder and piston



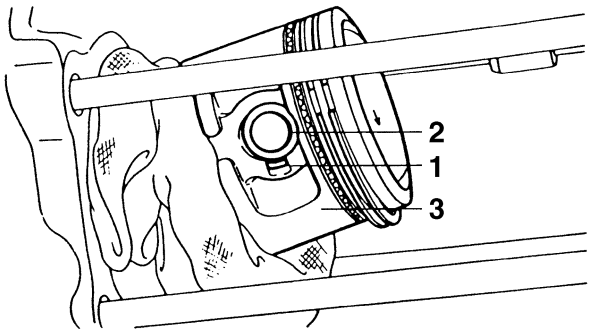
Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-5.
1	Cylinder	1	
2	Cylinder gasket	1	
3	Dowel pin	2	
4	Piston pin clip	2	
5	Piston pin	1	
6	Piston	1	
7	Top ring	1	
8	2nd ring	1	
9	Oil ring	1	
			For installation, reverse the removal procedure.

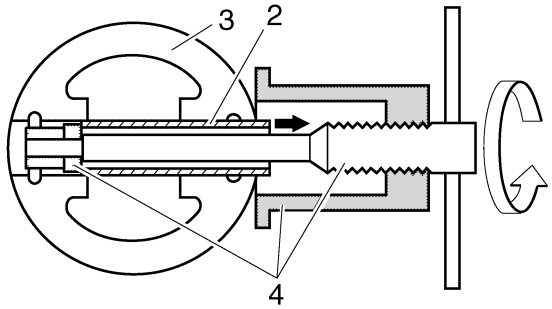
EAS24380
REMOVING THE PISTON
1. Remove:
   • Piston pin clips “1”
   • Piston pin “2”
   • Piston “3”

ECA13810
NOTICE
Do not use a hammer to drive the piston pin out.

TIP
- Before removing the piston pin clips, cover the crankcase opening with a clean rag to prevent them from falling into the crankcase.
- Before removing the piston pin, deburr the piston pin clip grooves and the piston pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set “4”.

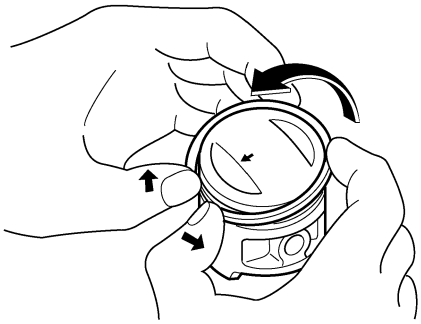
Piston pin puller set
90890-01304
Piston pin puller
YU-01304





2. Remove:
   • Top ring
   • 2nd ring
   • Oil ring

TIP
When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS24400
CHECKING THE CYLINDER AND PISTON
1. Check:
   • Piston wall
   • Cylinder wall
   Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   • Piston-to-cylinder clearance

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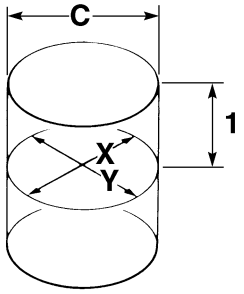
a. Measure cylinder bore “C” with the cylinder bore gauge.



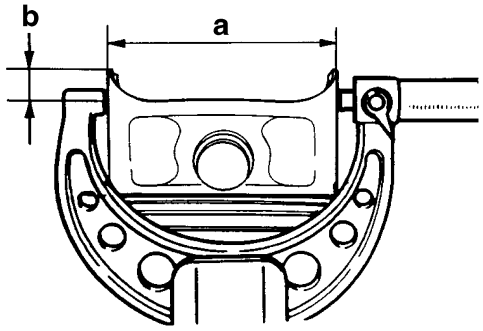
1. 10–15 mm (0.39–0.59 in) from the top of the cylinder

TIP
Measure cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Bore
35.995–36.015 mm
(1.4171–1.4179 in)
Wear limit
36.050 mm (1.4193 in)
“C” = (X + Y)/2

b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.
c. Measure piston skirt diameter D “a” with the micrometer.

Piston
Diameter D
35.960–35.980 mm
(1.4157–1.4165 in)



b. 5 mm (0.20 in) from the bottom edge of the piston

d. If out of specification, replace the piston and piston rings as a set.
e. Calculate the piston-to-cylinder clearance with the following formula.

• Piston-to-cylinder clearance =
Cylinder bore “C” -
Piston skirt diameter “P”

Piston-to-cylinder clearance
0.030–0.040 mm (0.0012–0.0016 in)

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

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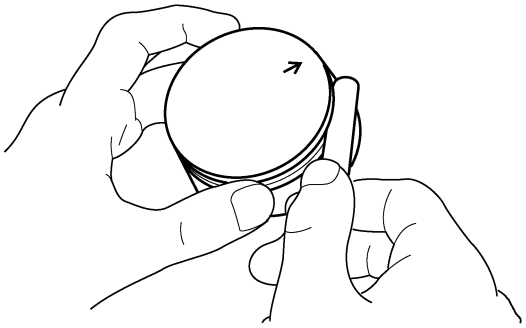
EAS24430
CHECKING THE PISTON RINGS

1. Measure:
• Piston ring side clearance
Out of specification → Replace the piston and piston rings as a set.

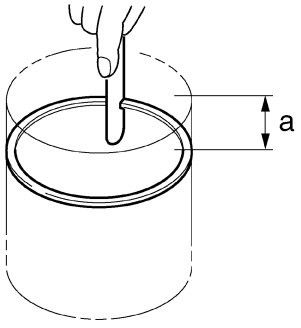
TIP
Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

Piston ring
Top ring
Ring side clearance
0.020–0.070 mm (0.0008–0.0028 in)
Limit
0.120 mm (0.0047 in)
2nd ring
Ring side clearance
0.020–0.060 mm (0.0008–0.0024 in)
Limit
0.120 mm (0.0047 in)



2. Install:
• Piston ring
(into the cylinder)

TIP
Level the piston ring into the cylinder with the piston crown.



a. 10–15 mm (0.39–0.59 in)

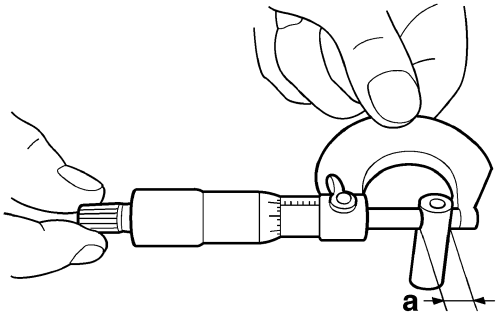
3. Measure:
• Piston ring end gap
Out of specification → Replace the piston ring.

TIP
The oil ring expander spacer’s end gap cannot be measured. If the oil ring rail’s gap is excessive, replace all three piston rings.

Piston ring
Top ring
End gap (installed)
0.10–0.25 mm (0.0039–0.0098 in)
Limit
0.50 mm (0.0197 in)
2nd ring
End gap (installed)
0.15–0.30 mm (0.0059–0.0118 in)
Limit
0.65 mm (0.0256 in)
Oil ring
End gap (installed)
0.20–0.70 mm (0.0079–0.0276 in)

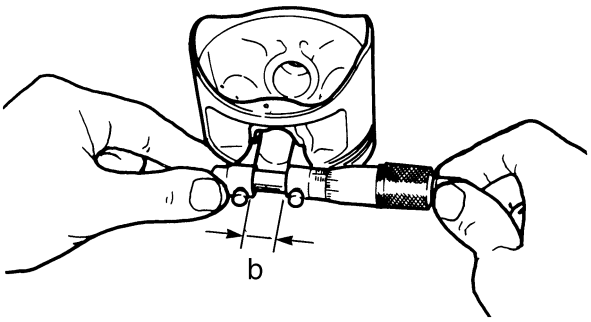
EAS24440
CHECKING THE PISTON PIN
1. Check:
   • Piston pin
   Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   • Piston pin outside diameter "a"
   Out of specification → Replace the piston pin.

Piston pin outside diameter
11.996–12.000 mm (0.4723–0.4724 in)
Limit
11.976 mm (0.4715 in)



3. Measure:
   • Piston pin bore diameter "b"
   Out of specification → Replace the piston.

Piston pin bore inside diameter
12.002–12.013 mm (0.4725–0.4730 in)
Limit
12.043 mm (0.4741 in)



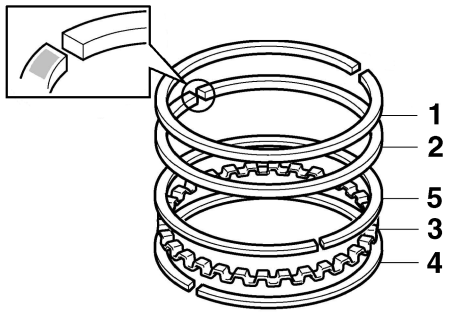
4. Calculate:
   • Piston-pin-to-piston-pin-bore clearance
   Out of specification → Replace the piston pin and piston as a set.

• Piston-pin-to-piston-pin-bore clearance = Piston pin bore diameter "b" - Piston pin outside diameter "a"

Piston-pin-to-piston-pin-bore clearance
0.002–0.017 mm (0.0001–0.0007 in)
Limit
0.067 mm (0.0026 in)

EAS24450
INSTALLING THE PISTON AND CYLINDER
1. Install:
   • Top ring "1"
   • 2nd ring "2"
   • Oil ring expander "3"
   • Lower oil ring rail "4"
   • Upper oil ring rail "5"

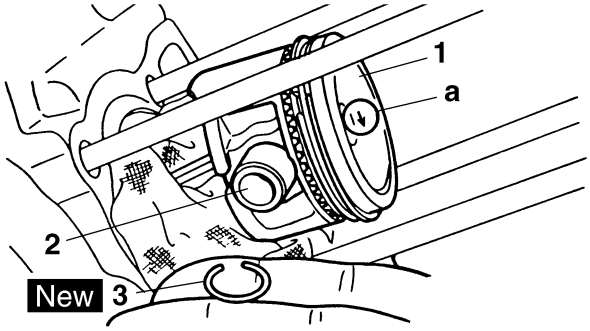
TIP
Be sure to install the piston rings so that the manufacturer's marks or numbers face up.



2. Install:
   • Piston "1"
   • Piston pin "2"
   • Piston pin clips "3" New

TIP
• Apply engine oil onto the piston pin.

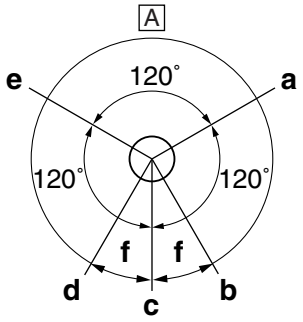
• Make sure the arrow mark “a” on the piston points towards the exhaust side of the cylinder.
• Before installing the piston pin clips, cover the crankcase opening with a clean rag to prevent them from falling into the crankcase.



3. Lubricate:
   • Piston
   • Piston rings
   • Cylinder
   (with the recommended lubricant)

	Recommended lubricant **Engine oil**

4. Offset:
   • Piston ring end gaps



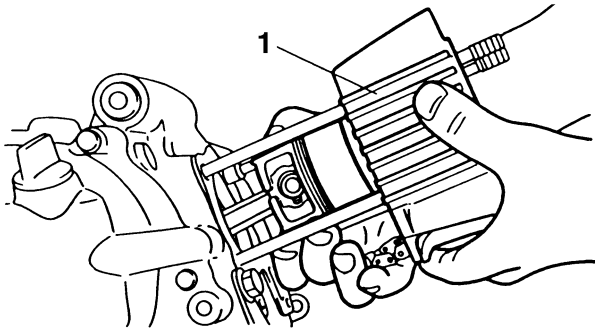
a. Top ring
b. Upper oil ring rail
c. Oil ring expander
d. Lower oil ring rail
e. 2nd ring
f. 20 mm (0.79 in)

A. Exhaust side

5. Install:
   • Cylinder gasket New
   • Dowel pins
   • Cylinder “1”

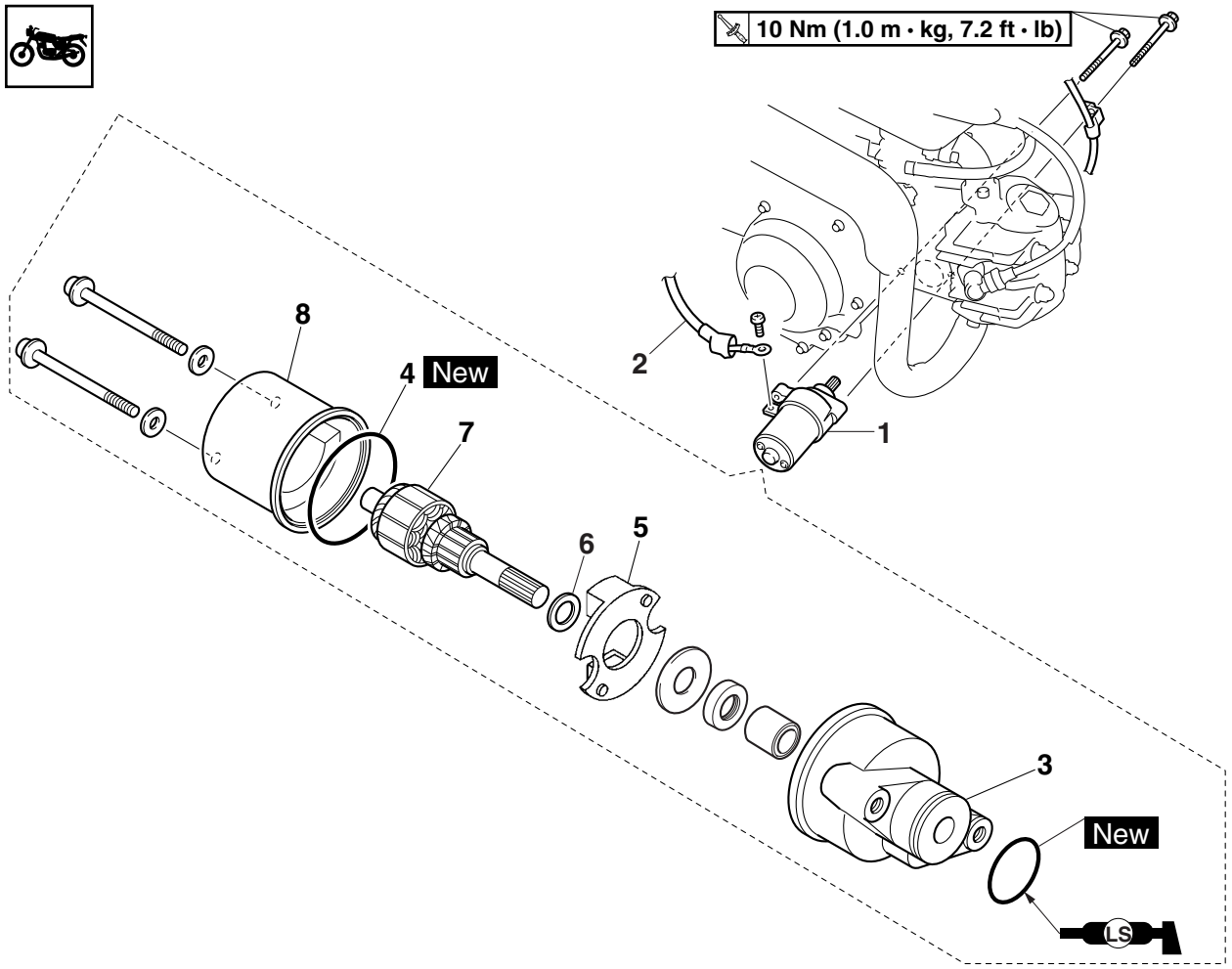
TIP

• While compressing the piston rings with one hand, install the cylinder with the other hand.
• Pass the timing chain and timing chain guide (intake side) through the timing chain cavity.



EAS24780
ELECTRIC STARTER

Removing and disassembling the starter motor

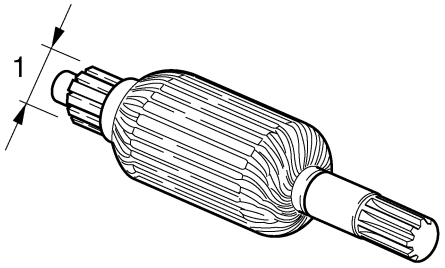


Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Refer to "CHANGING THE ENGINE OIL" on page 3-10.
1	Starter motor assembly	1	
2	Starter motor lead	1	Disconnect.
3	Starter motor front cover	1	
4	O-ring	1	
5	Brush holder assembly	1	
6	Washer	1	
7	Armature assembly	1	
8	Starter motor yoke	1	
			For assembly and installation, reverse the removal and disassembly procedure.

EAS24791
CHECKING THE STARTER MOTOR

1. Check:
   • Commutator
   Dirt → Clean with 600-grit sandpaper.
2. Measure:
   • Commutator diameter “1”
   Out of specification → Replace the starter motor.

Limit
16.6 mm (0.65 in)



3. Measure:
   • Mica undercut “a”
   Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
1.35 mm (0.05 in)

TIP
The mica of the commutator must be undercut to ensure proper operation of the commutator.

4. Measure:
   • Armature assembly resistances (commutator and insulation)
   Out of specification → Replace the starter motor.

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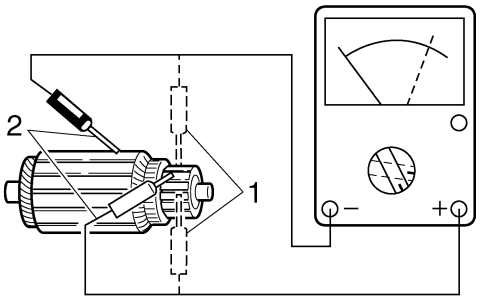
a. Measure the armature assembly resistances with the pocket tester.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Armature coil
Commutator resistance “1”
Continuity (0.0351–0.0429 Ω at 20 °C (68 °F))
Insulation resistance “2”
Not continuity (Above 1 MΩ at 20 °C (68 °F))

b. If any resistance is out of specification, replace the starter motor.



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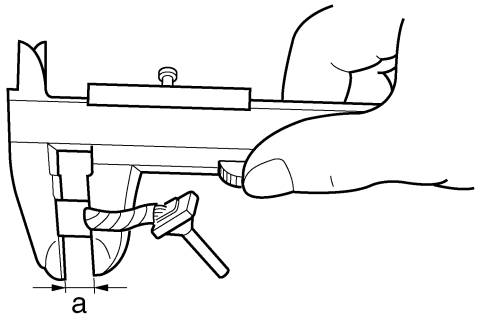
5. Measure:
   • Brush length “a”
   Out of specification → Replace the brush holder assembly.

Limit
3.50 mm (0.14 in)



6. Measure:
   • Brush spring force
   Out of specification → Replace the brush holder assembly.

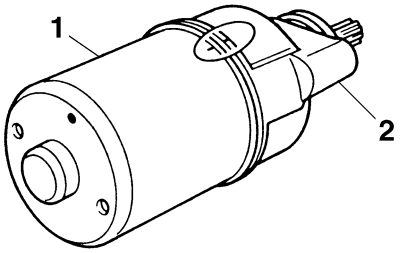
Brush spring force
3.92–5.88 N (400–600 gf, 14.11–21.17 oz)

7. Check:
   • Gear teeth
   Damage/wear → Replace the gear.
8. Check:
   • Bearing
   Damage/wear → Replace the front starter motor cover.

EAS24800
ASSEMBLING THE STARTER MOTOR

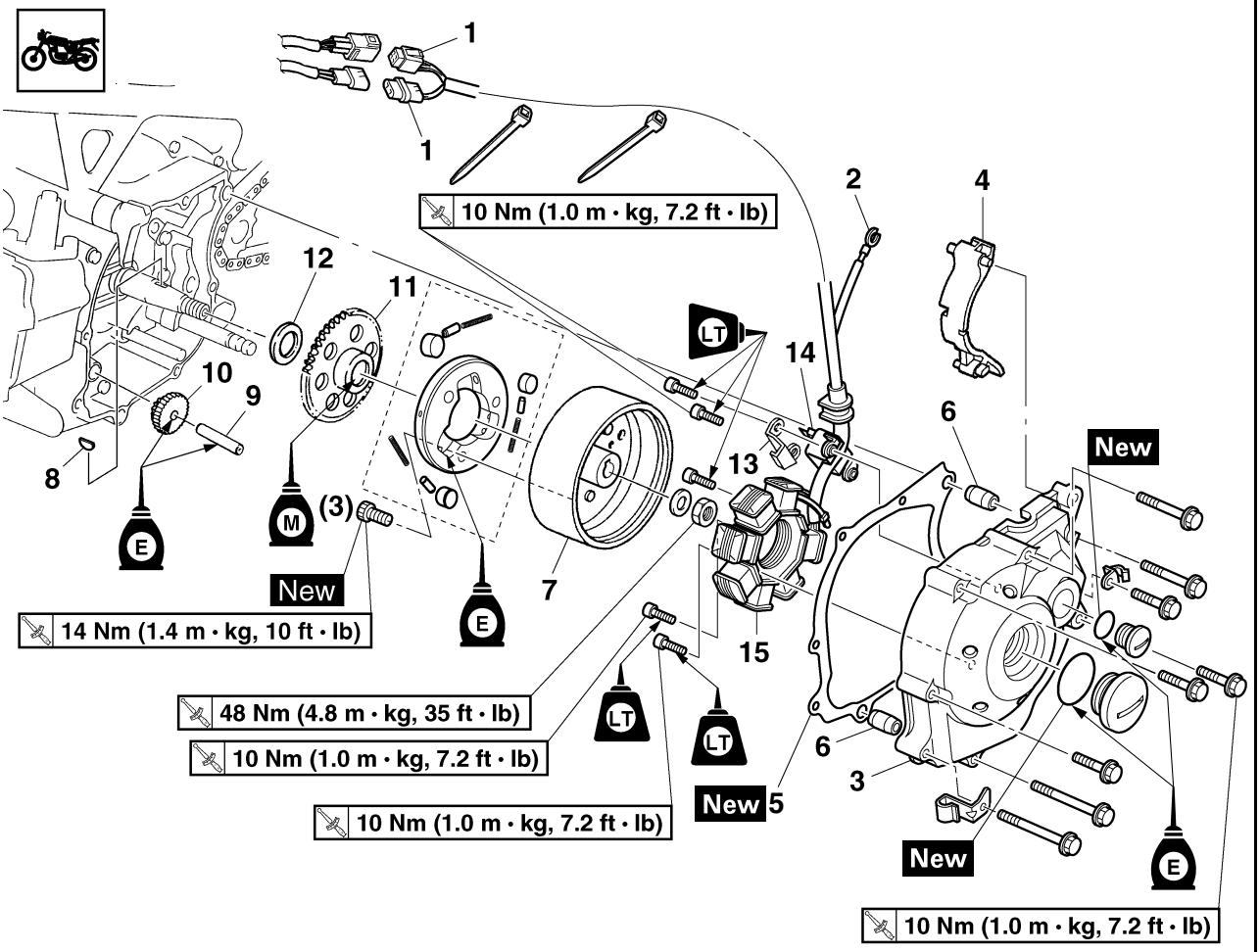
1. Install:
   • Starter motor yoke “1”
   • Starter motor front cover “2”

TIP
Align the match mark on the starter motor yoke with the match mark on the front starter motor cover.



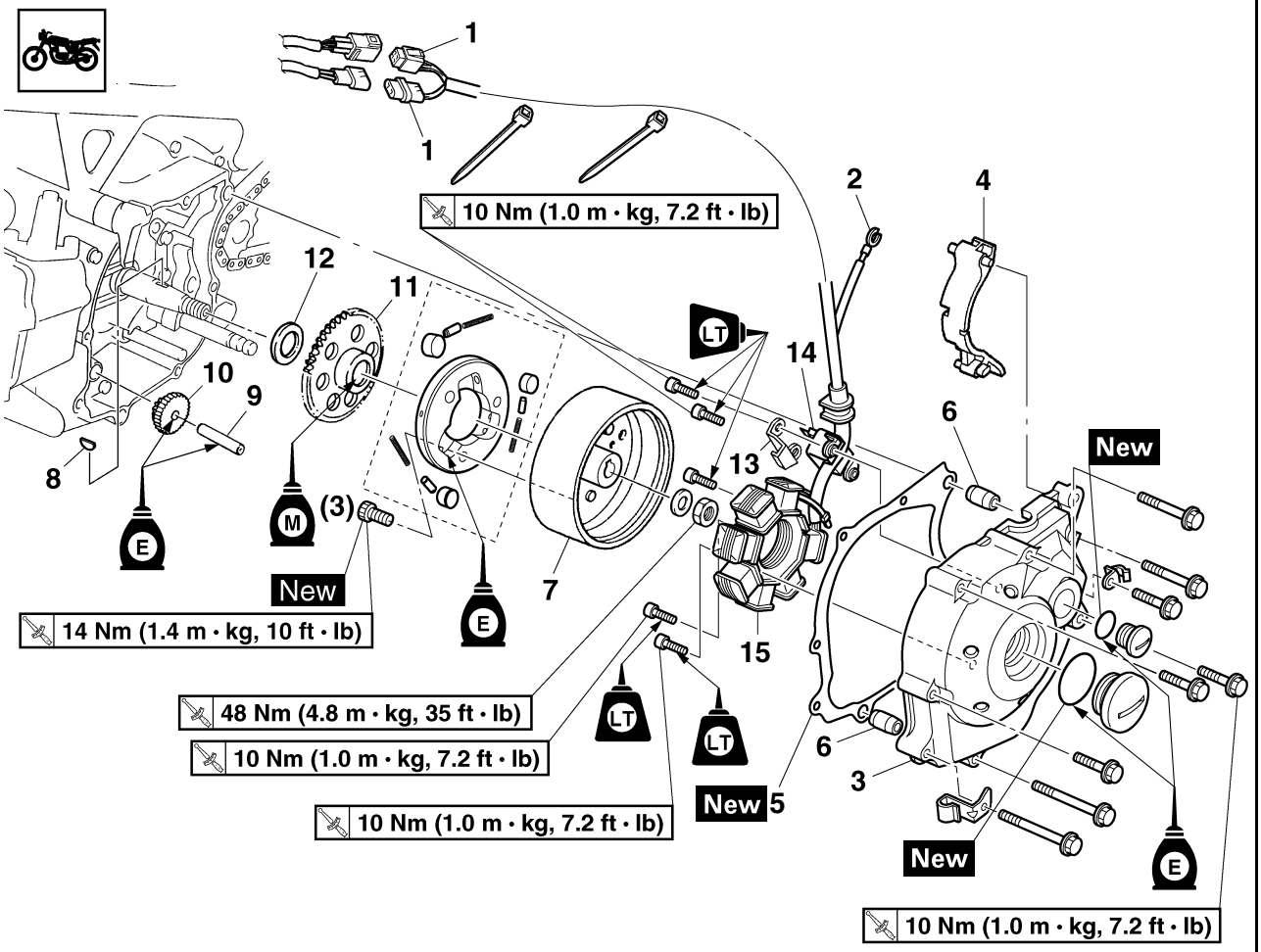
EAS24480
GENERATOR

Removing the AC magneto rotor and stator coil



Order	Job/Parts to remove	Q'ty	Remarks
	Air scoops/Engine guard		Refer to "GENERAL CHASSIS" on page 4-1.
	Drive sprocket cover		Refer to "CHAIN DRIVE" on page 4-27.
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-27.
	Shift pedal		Refer to "ENGINE REMOVAL" on page 5-2.
1	Pickup coil/stator assembly coupler	2	Disconnect.
2	Neutral switch lead	1	Disconnect.
3	AC magneto cover	1	
4	Chain guide	1	
5	AC magneto cover gasket	1	
6	Dowel pin	2	
7	AC magneto rotor	1	
8	Woodruff key	1	
9	Starter clutch idle gear shaft	1	
10	Starter clutch idle gear	1	
11	Starter clutch gear	1	
12	Shim	1	

Removing the AC magneto rotor and stator coil



Order	Job/Parts to remove	Q'ty	Remarks
13	Pickup coil/stator assembly lead holder	1	
14	Pickup coil	1	
15	Stator coil	1	
			For installation, reverse the removal procedure.

EAS24490
REMOVING THE GENERATOR

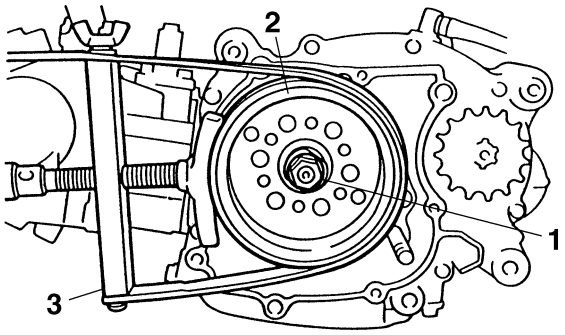
1. Remove:
   • AC magneto cover

TIP
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Remove:
   • AC magneto rotor nut "1"
   • Washer

TIP
- While holding the AC magneto rotor "2" with the sheave holder "3", loosen the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A

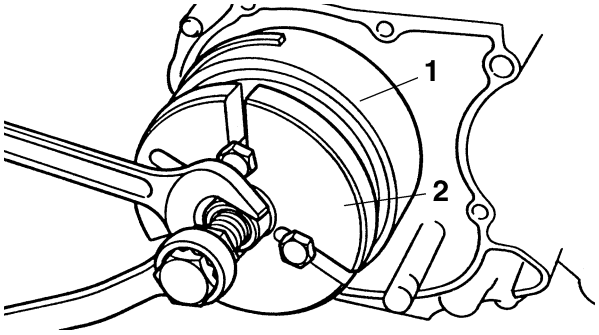


3. Remove:
   • AC magneto rotor "1"
   (with the flywheel puller "2")
   • Woodruff key

ECA1P6U510
NOTICE
To protect the end of the crankshaft, place an appropriate sized socket between the flywheel puller set center bolt and the crankshaft.

TIP
Make sure the flywheel puller is centered over the AC magneto rotor.

Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B



EAS24500
INSTALLING THE GENERATOR

1. Install:
   • Woodruff key
   • AC magneto rotor
   • Washer
   • AC magneto rotor nut

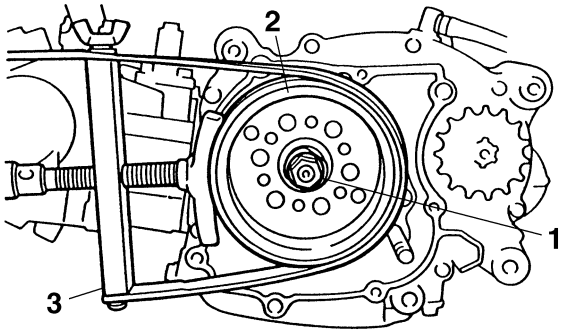
TIP
- Clean the tapered portion of the crankshaft and the AC magneto rotor hub.
- When installing the AC magneto rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.

2. Tighten:
   • AC magneto rotor nut "1"

AC magneto rotor nut
48 Nm (4.8 m·kg, 35 ft·lb)

TIP
- While holding the AC magneto rotor "2" with the sheave holder "3", tighten the AC magneto rotor nut.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

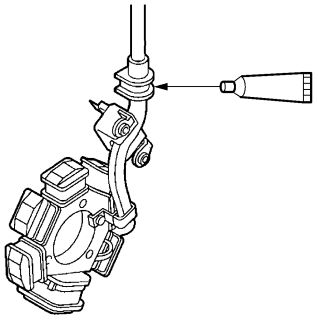
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



3. Apply:
   • Sealant

(onto the pickup coil/stator assembly lead grommet)

Yamaha bond No. 1215
90890-85505
(Three bond No.1215®)



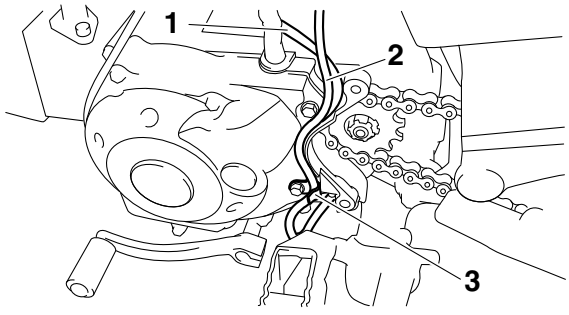
4. Install:
   • AC magneto cover

AC magneto cover bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP
Tighten the AC magneto cover bolts in stages and in a crisscross pattern.

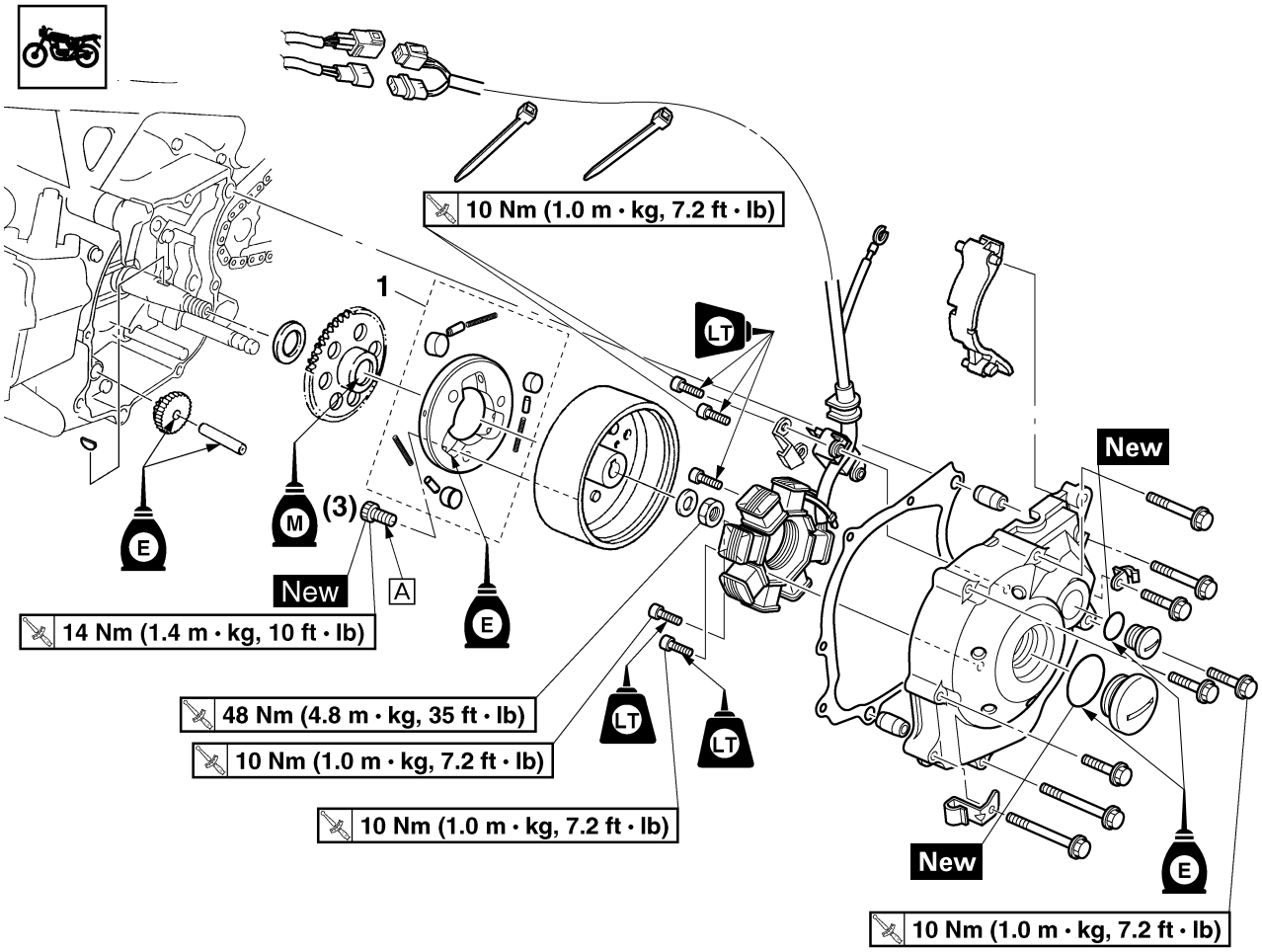
5. Install:
   • Neutral switch lead “1”

TIP
- Pass the starter motor lead “2” and neutral switch lead “1” into the AC magneto cover groove as shown.
- Fasten the starter motor lead with the clamp “3”.
  Refer to “CABLE ROUTING” on page 2-27.



EAS24550
STARTER CLUTCH

Removing the starter clutch

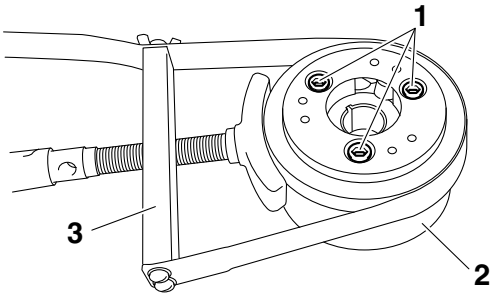


Order	Job/Parts to remove	Q'ty	Remarks
	AC magneto rotor		Refer to "GENERATOR" on page 5-30.
1	Starter clutch assembly	1	
			For installation, reverse the removal procedure.

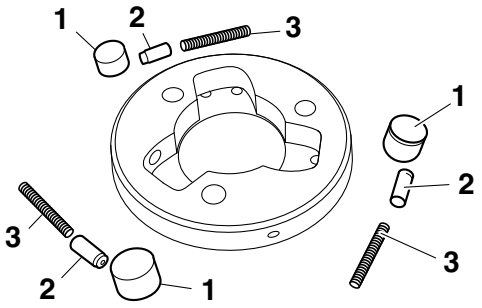
EAS24560
REMOVING THE STARTER CLUTCH
1. Remove:
   • Starter clutch bolts “1”

TIP
- While holding the AC magneto rotor “2” with the sheave holder “3”, remove the starter clutch bolts.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS24570
CHECKING THE STARTER CLUTCH
1. Check:
   • Starter clutch rollers “1”
   • Starter clutch spring caps “2”
   • Starter clutch springs “3”
   Damage/wear → Replace the starter clutch assembly.



2. Check:
   • Starter clutch idle gear
   • Starter clutch gear
   Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   • Starter clutch gear contacting surfaces
   Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   • Starter clutch operation

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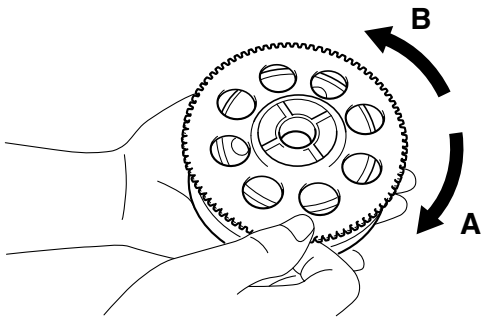
a. Install the starter clutch gear onto the starter clutch and hold the AC magneto rotor.
b. When turning the starter clutch gear clockwise “A”, the starter clutch and the starter clutch drive gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch gear counterclockwise “B”, it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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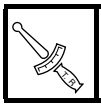
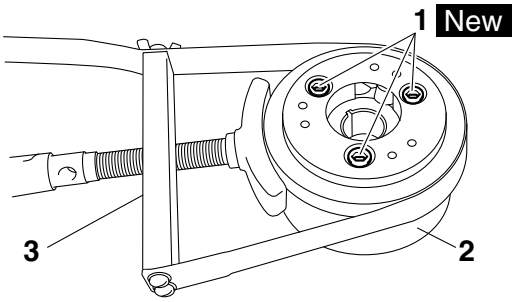
EAS24600
INSTALLING THE STARTER CLUTCH
1. Install:
   • Starter clutch assembly
   • Starter clutch bolts “1” New

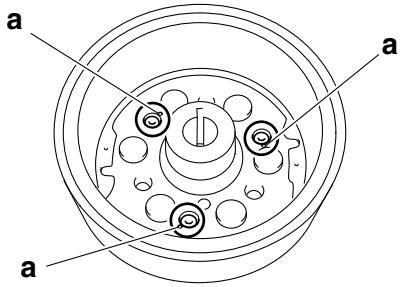


Starter clutch bolt
14 Nm (1.4 m·kg, 10 ft·lb)

TIP
- While holding the AC magneto rotor “2” with the sheave holder “3”, tighten the starter clutch bolt.
- Do not allow the sheave holder to touch the projection on the AC magneto rotor.
- Stake the end “a” of each starter clutch bolt.

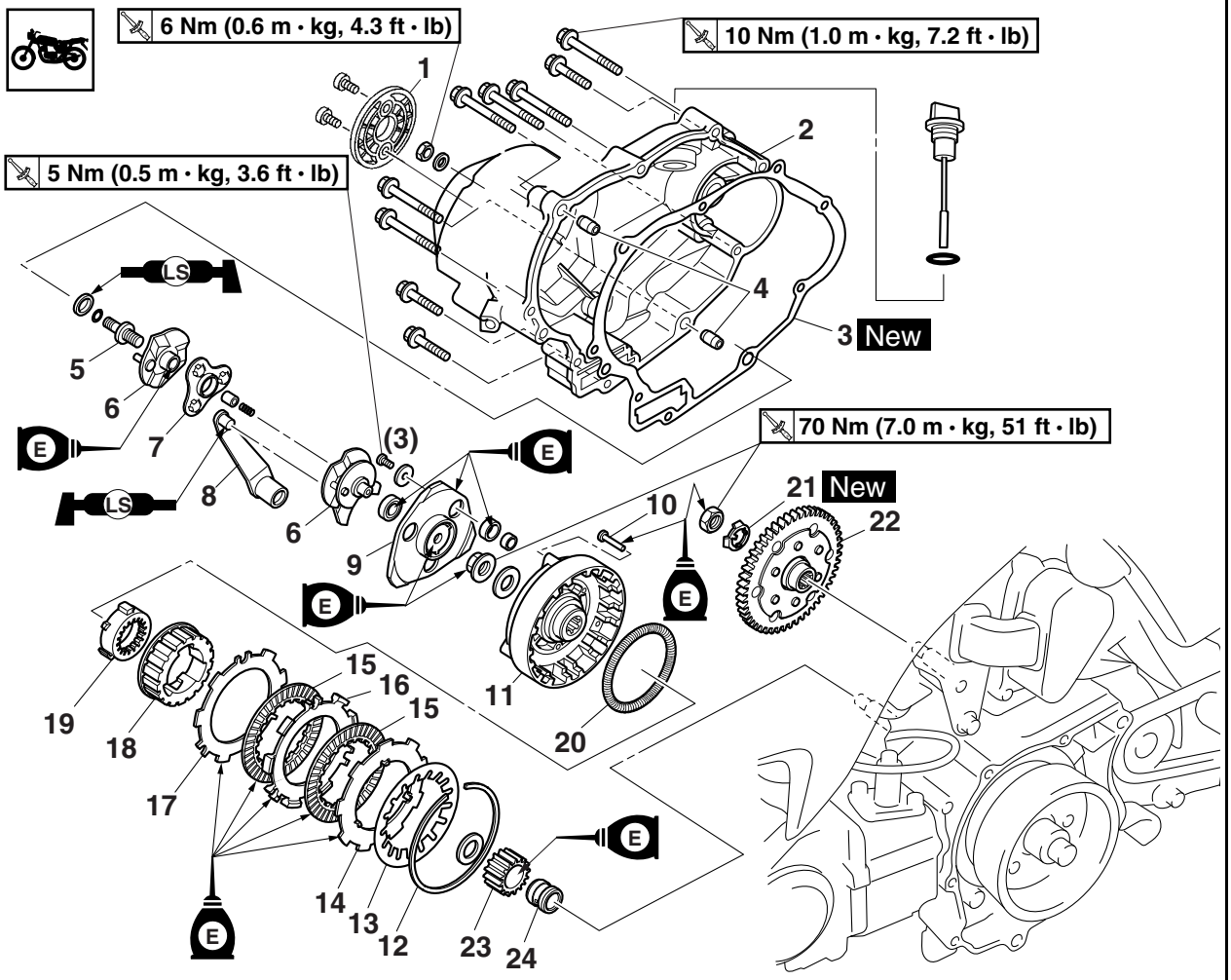
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A


1 New
3
2


a
a
a

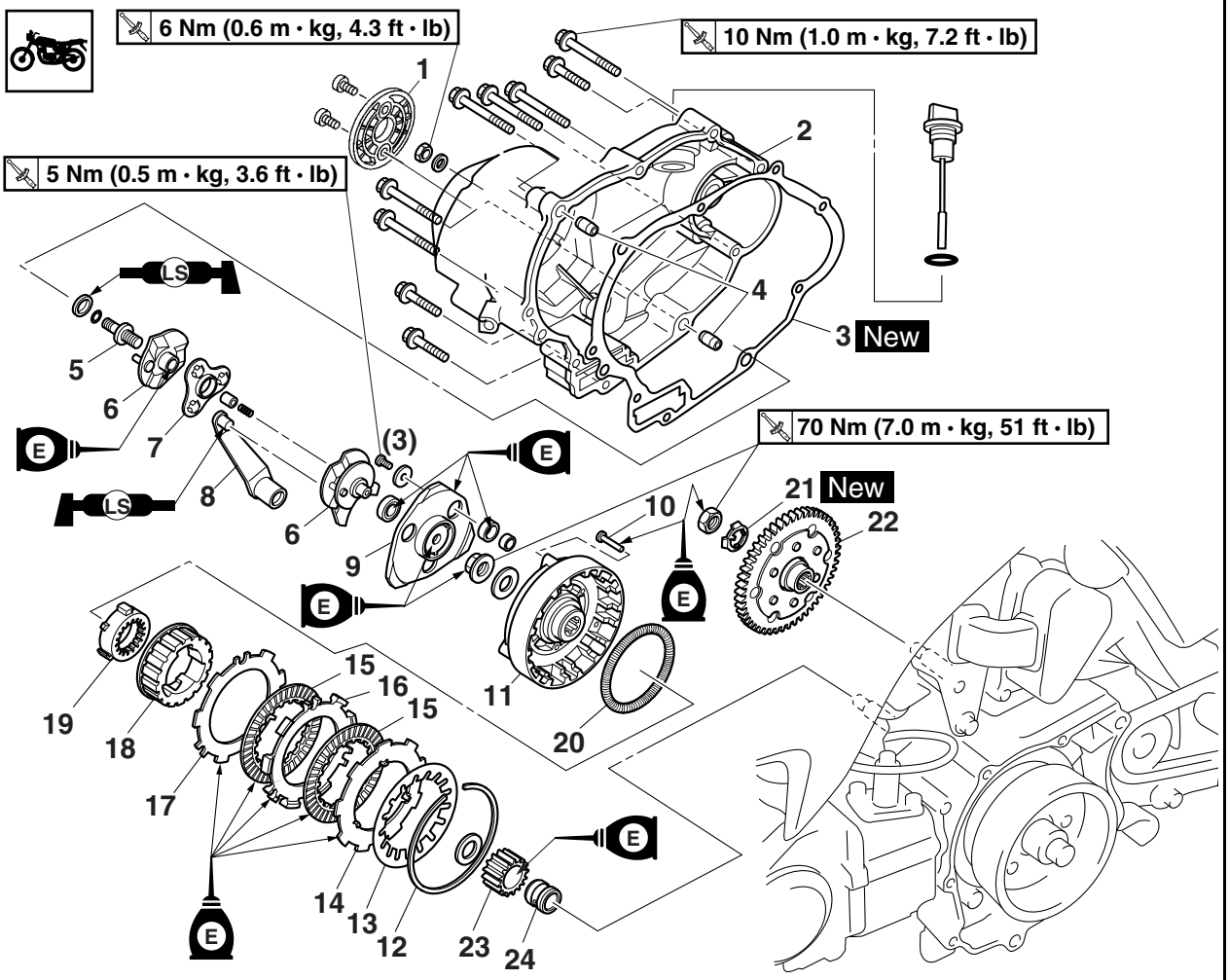
EAS25061
CLUTCH

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
	Brake pedal/Footrest assembly		Refer to "ENGINE REMOVAL" on page 5-2.
1	Clutch adjuster cover	1	
2	Clutch cover	1	
3	Clutch cover gasket	1	
4	Dowel pin	2	
5	Clutch release adjusting screw	1	
6	Shift guide	2	
7	Pawl holder	1	
8	Shift arm	1	
9	Pressure plate	1	
10	Guide pin	3	
11	Clutch housing	1	
12	Circlip	1	
13	Clutch spring plate	1	
14	Clutch plate 1	1	
15	Friction plate	2	
16	Clutch plate 2	1	
17	Clutch plate 3	1	
18	Clutch boss	1	

Removing the clutch



Order	Job/Parts to remove	Q'ty	Remarks
19	Outer drive gear	1	
20	Spring	1	
21	Lock washer	1	
22	Primary driven gear	1	
23	Primary drive gear	1	
24	Collar	1	
			For installation, reverse the removal procedure.

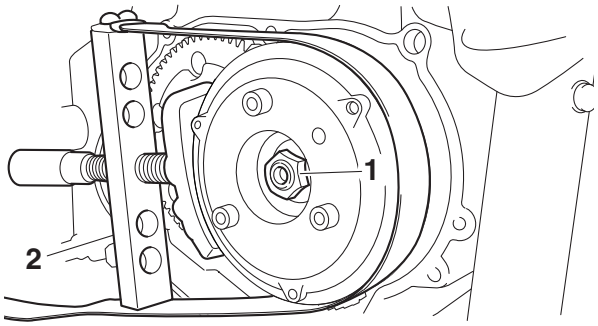
EAS25080
REMOVING THE CLUTCH
1. Remove:
   • Clutch cover

TIP
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Loosen:
   • Clutch housing nut "1"

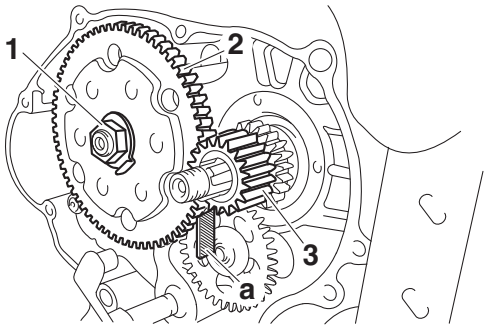
TIP
While holding the clutch housing with the sheave holder "2", loosen the clutch housing nut.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS1P6U509
REMOVING THE PRIMARY DRIVEN GEAR
1. Straighten the lock washer tab.
2. Loosen:
   • Primary driven gear nut "1"

TIP
Place an aluminum plate "a" between the teeth of the primary driven gear "2" and primary drive gear "3".

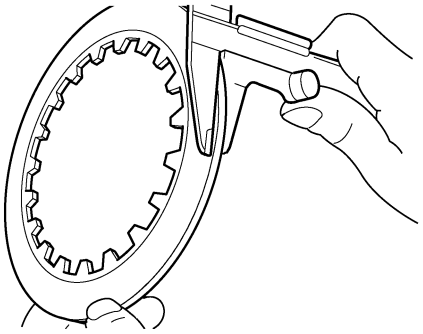


EAS25100
CHECKING THE FRICTION PLATES
The following procedure applies to all of the friction plates.

1. Check:
   • Friction plate
   Damage/wear → Replace the friction plates as a set.
2. Measure:
   • Friction plate thickness
   Out of specification → Replace the friction plates as a set.

TIP
Measure the friction plate at four places.

Friction plate thickness
2.92–3.08 mm (0.115–0.121 in)
Wear limit
2.82 mm (0.1110 in)

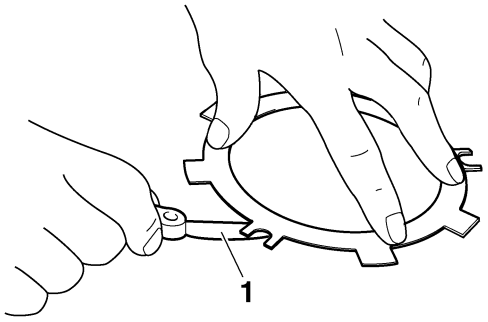


EAS25111
CHECKING THE CLUTCH PLATES
The following procedure applies to all of the clutch plates.

1. Check:
   • Clutch plate
   Damage → Replace the clutch plates as a set.
2. Measure:
   • Clutch plate warpage
   (with a surface plate and thickness gauge "1")
   Out of specification → Replace the clutch plates as a set.

Thickness gauge
90890-03079
Narrow gauge set
YM-34483

Warpage limit
0.20 mm (0.0079 in)



EAS25130
CHECKING THE CLUTCH SPRING PLATE
1. Check:
   • Clutch spring plate
   Damage → Replace.

EAS25150
CHECKING THE CLUTCH HOUSING
1. Check:
   • Clutch housing dogs
   Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

TIP
Pitting on the clutch housing dogs will cause erratic clutch operation.

2. Check:
   • Bearing
   Damage/wear → Replace the bearing and clutch housing.

EAS25160
CHECKING THE CLUTCH BOSS
1. Check:
   • Clutch boss splines
   Damage/pitting/wear → Replace the clutch boss.

TIP
Pitting on the clutch boss splines will cause erratic clutch operation.

EAS25170
CHECKING THE PRESSURE PLATE
1. Check:
   • Pressure plate
   Cracks/damage → Replace.
   • Bearing
   Damage/wear → Replace.

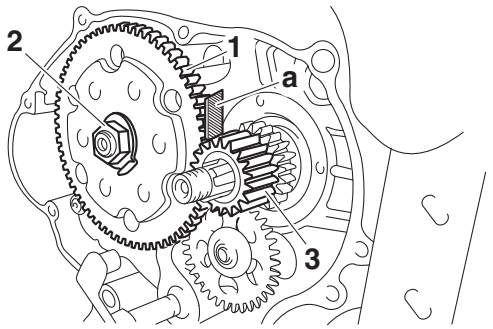
EAS25200
CHECKING THE PRIMARY DRIVE GEAR
1. Check:
   • Primary drive gear
   Damage/wear → Replace the primary drive and primary driven gears as a set.
   Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS25210
CHECKING THE PRIMARY DRIVEN GEAR
1. Check:
   • Primary driven gear
   Damage/wear → Replace the primary drive and primary driven gears as a set.
   Excessive noise during operation → Replace the primary drive and primary driven gears as a set.

EAS25230
INSTALLING THE PRIMARY DRIVEN GEAR
1. Install:
   • Primary driven gear “1”
   • Lock washer New
   • Primary driven gear nut “2”

TIP
Place an aluminum plate “a” between the teeth of the primary driven gear “1” and primary drive gear “3”.

	**Primary driven gear nut** **70 Nm (7.0 m·kg, 51 ft·lb)**



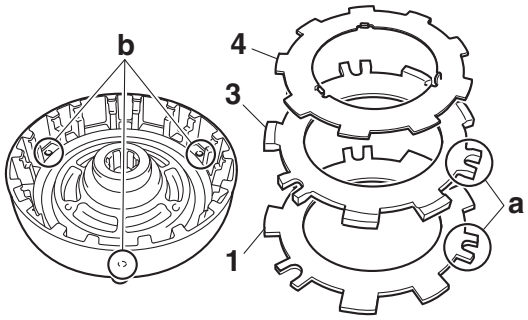
2. Bend the lock washer tab along a flat side of the nut.

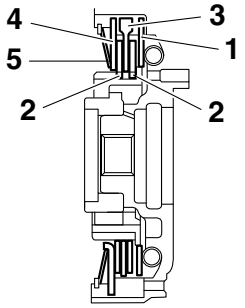
EAS25260
INSTALLING THE CLUTCH
1. Lubricate:
   • Friction plates
   • Clutch plates
   (with the recommended lubricant)

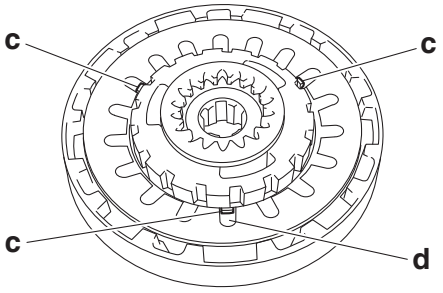
	**Recommended lubricant** **Engine oil**

2. Install:
   • Clutch plate 3 “1”
   • Friction plates “2”
   • Clutch plate 2 “3”
   • Clutch plate 1 “4”
   • Clutch spring plate “5”

TIP
- Align the cutouts "a" in clutch plate 2 and clutch plate 3 with the holes "b" in the clutch housing.
- Install the clutch spring plate "5" as shown in the illustration.
- Align the projections "c" on the clutch plate 1 with the notches "d" in the clutch spring plate.





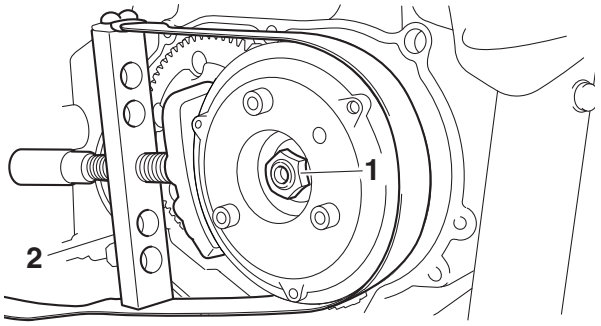


3. Tighten:
   - Clutch housing nut "1"

	Clutch housing nut **70 Nm (7.0 m·kg, 51 ft·lb)**

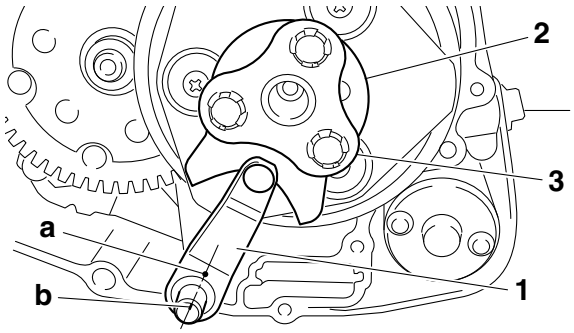
TIP
While holding the clutch housing with the sheave holder "2", tighten the clutch housing nut.

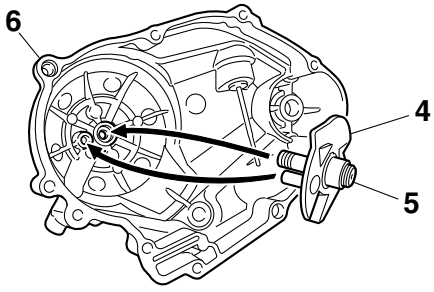
	Sheave holder **90890-01701** **Primary clutch holder** **YS-01880-A**



4. Install:
   - Shift arm "1"
   - Inner shift guide "2"
   - Pawl holder "3"
   - Outer shift guide "4"
   - Clutch release adjusting screw "5"

TIP
- Align the punch mark "a" on the shift arm with the punch mark "b" on the shift shaft.
- Install the outer shift guide "4" and clutch adjusting screw "5" in the crankcase cover "6" as shown in the illustration.
- When installing the crankcase cover, align the pawl holder balls with the grooves in the outer shift guide "4".





5. Install:
   - Clutch cover

	Clutch cover bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

6. Adjust:
   - Clutch release system

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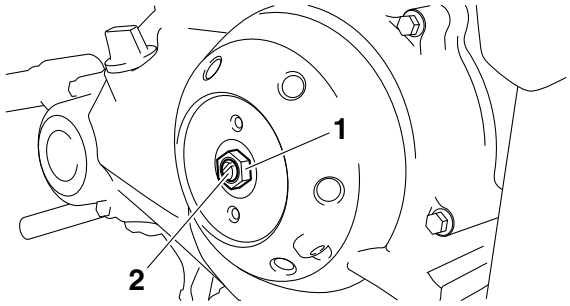
a. Loosen the locknut “1”.
b. Turn the clutch release adjusting screw “2” out until resistance is felt, and then turn it in the specified number of turns.

	**Clutch release adjusting screw 1/8 turn in**



c. Tighten the locknut.

TIP

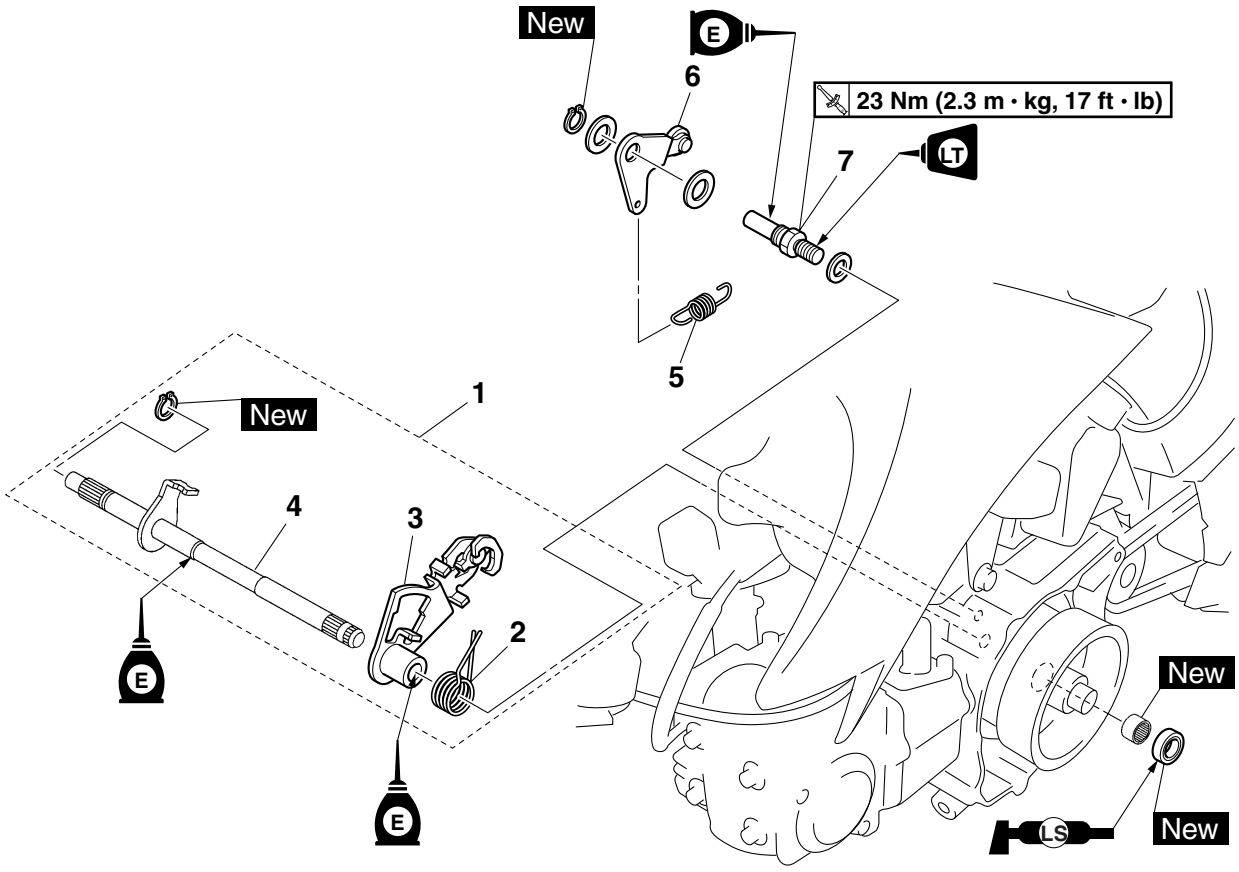
Hold the adjusting screw and tighten the locknut.

	**Locknut (clutch release adjusting screw) 6 Nm (0.6 m·kg, 4.3 ft·lb)**

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

EAS25410
SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing/Primary driven gear		Refer to "CLUTCH" on page 5-37.
1	Shift shaft assembly	1	
2	Shift lever spring	1	
3	Shift lever	1	
4	Shift shaft	1	
5	Stopper lever spring	1	
6	Stopper lever	1	
7	Stopper bolt	1	
			For installation, reverse the removal procedure.

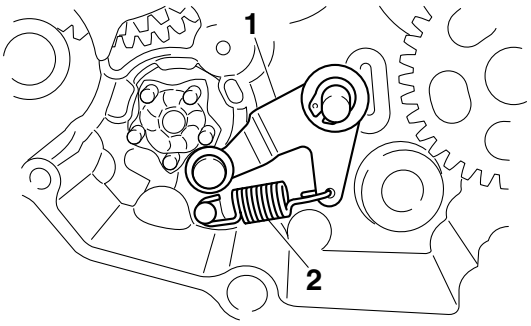
EAS25420
CHECKING THE SHIFT SHAFT
1. Check:
   • Shift shaft
   Bends/damage/wear → Replace.

EAS25430
CHECKING THE STOPPER LEVER
1. Check:
   • Stopper lever
   Bends/damage → Replace.
   Roller turns roughly → Replace the stopper lever.
   • Stopper lever spring
   Damage/wear → Replace.

EAS25440
CHECKING THE SHIFT LEVER
1. Check:
   • Shift lever
   Bends/damage/wear → Replace.
   • Shift lever spring
   Damage/wear → Replace.

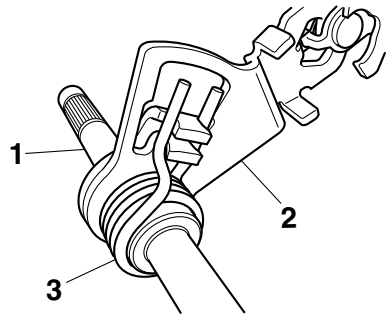
EAS25451
INSTALLING THE SHIFT SHAFT
1. Install:
   • Needle bearing New
   (to the crankcase)
   • Oil seal New
   (to the crankcase)
2. Install:
   • Washers
   • Stopper lever “1”
   • Circlip New
   • Stopper lever spring “2”

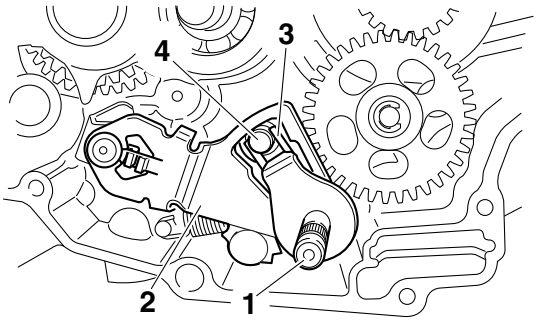
TIP
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss.
- Mesh the stopper lever with the shift drum segment assembly.



3. Install:
   • Shift shaft “1”
   • Shift lever “2”
   • Shift lever spring “3”

TIP
Hook the end of the shift lever spring onto the stopper bolt “4”.

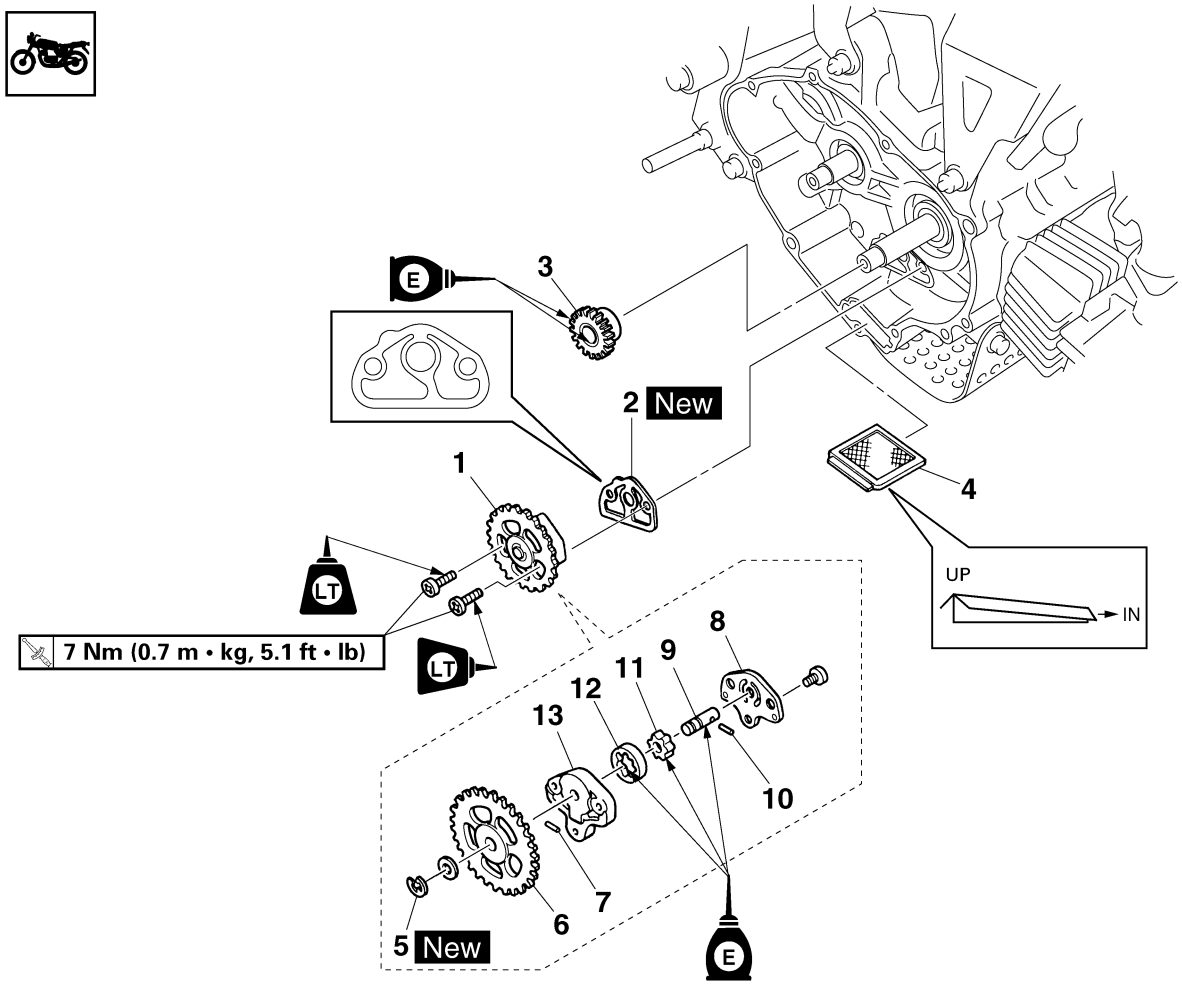




EAS24911

OIL PUMP

Removing the oil pump



Order	Job/Parts to remove	Q'ty	Remarks
	Primary drive gear/Primary driven gear		Refer to "CLUTCH" on page 5-37.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-43.
1	Oil pump assembly	1	
2	Oil pump gasket	1	
3	Oil pump drive gear	1	
4	Oil strainer	1	
5	Circlip	1	
6	Oil pump driven gear	1	
7	Pin	1	
8	Oil pump housing cover	1	
9	Oil pump shaft	1	
10	Pin	1	
11	Oil pump inner rotor	1	
12	Oil pump outer rotor	1	
13	Oil pump housing	1	
			For installation, reverse the removal procedure.

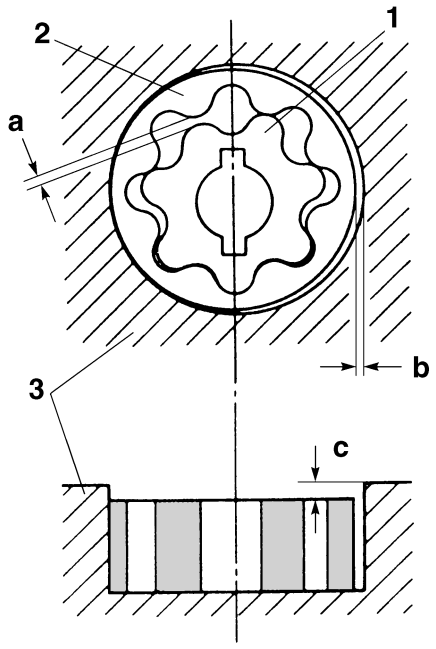
EAS24960
CHECKING THE OIL PUMP

1. Check:
   - Oil pump drive gear
   - Oil pump driven gear
   - Oil pump housing
   - Oil pump housing cover

   Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance "a"
   - Outer-rotor-to-oil-pump-housing clearance "b"
   - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance "c"

   Out of specification → Replace the oil pump.

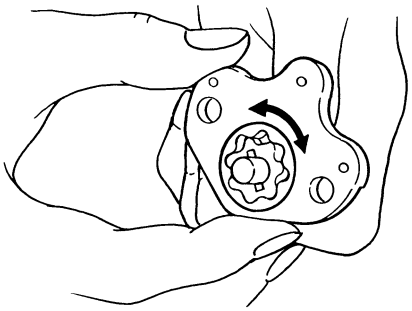
Inner-rotor-to-outer-rotor-tip clearance
0.150 mm or less (0.0059 in or less)
Limit
0.23 mm (0.0091 in)
Outer-rotor-to-oil-pump-housing clearance
0.07 mm (0.0028 in)
Limit
0.15 mm (0.0059 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.06–0.10 mm (0.0024–0.0039 in)
Limit
0.17 mm (0.0067 in)



1. Inner rotor
2. Outer rotor
3. Oil pump housing

3. Check:
   - Oil pump operation

   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS24990
CHECKING THE OIL STRAINER

1. Check:
   - Oil strainer

   Damage → Replace.
   Contaminants → Clean with solvent.

EAS25000
ASSEMBLING THE OIL PUMP

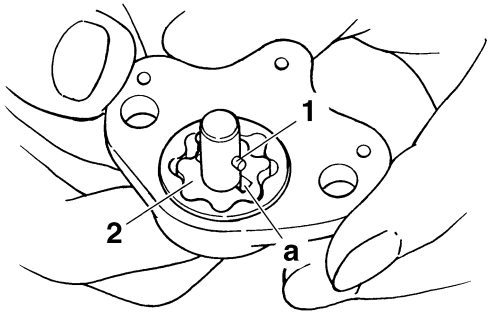
1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft

   (with the recommended lubricant)

Recommended lubricant
Engine oil

2. Install:
   - Oil pump outer rotor
   - Oil pump inner rotor
   - Oil pump shaft
   - Pin

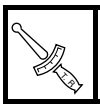
TIP
When installing the inner rotor, align the pin "1" in the oil pump shaft with the groove "a" in the inner rotor "2".



3. Check:
   • Oil pump operation
   Refer to “CHECKING THE OIL PUMP” on page 5-46.

EAS25020
INSTALLING THE OIL PUMP

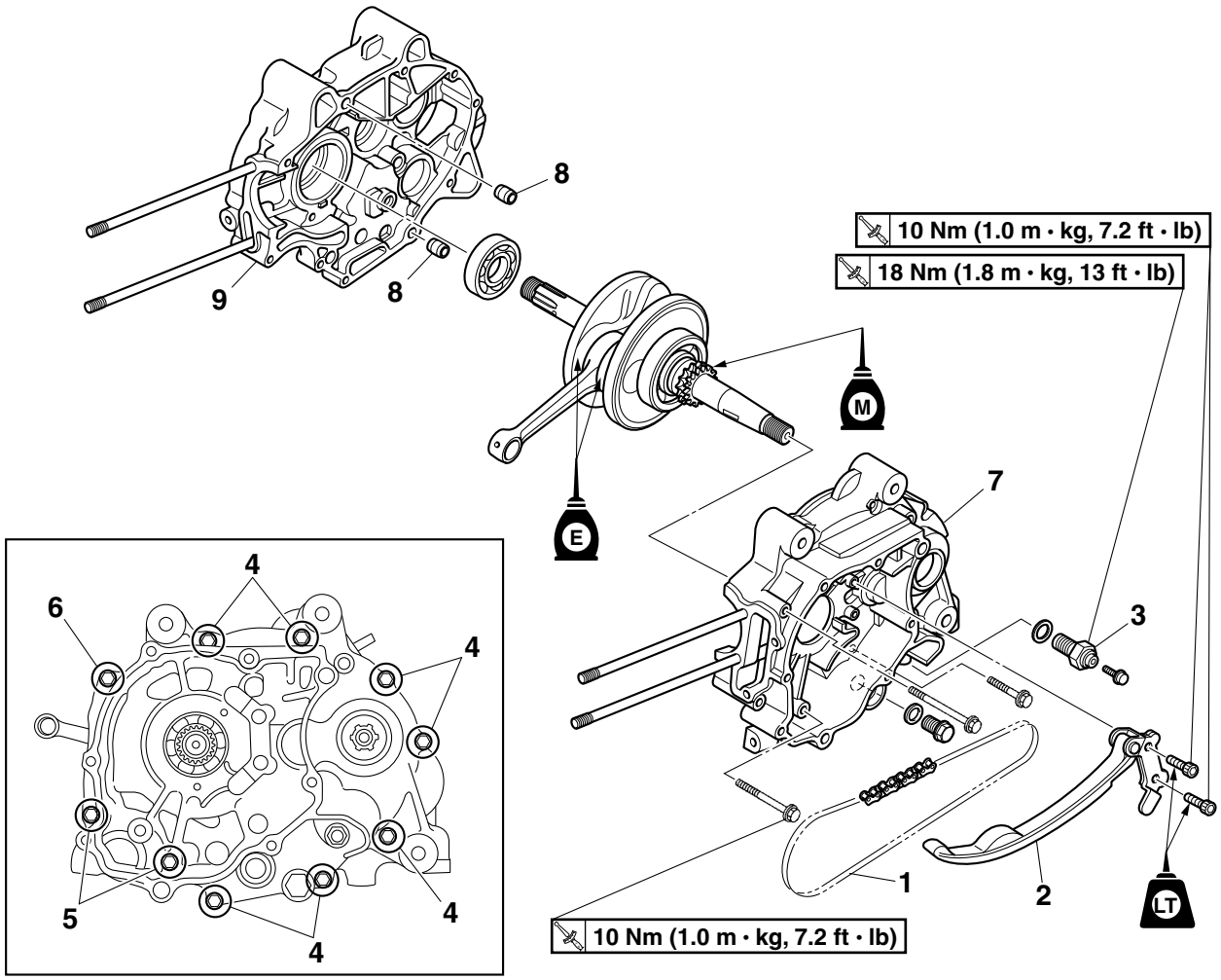
1. Install:
   • Oil pump

	**Oil pump screw** **7 Nm (0.7 m·kg, 5.1 ft·lb)**

ECA13890
NOTICE
After tightening the bolts, make sure the oil pump turns smoothly.

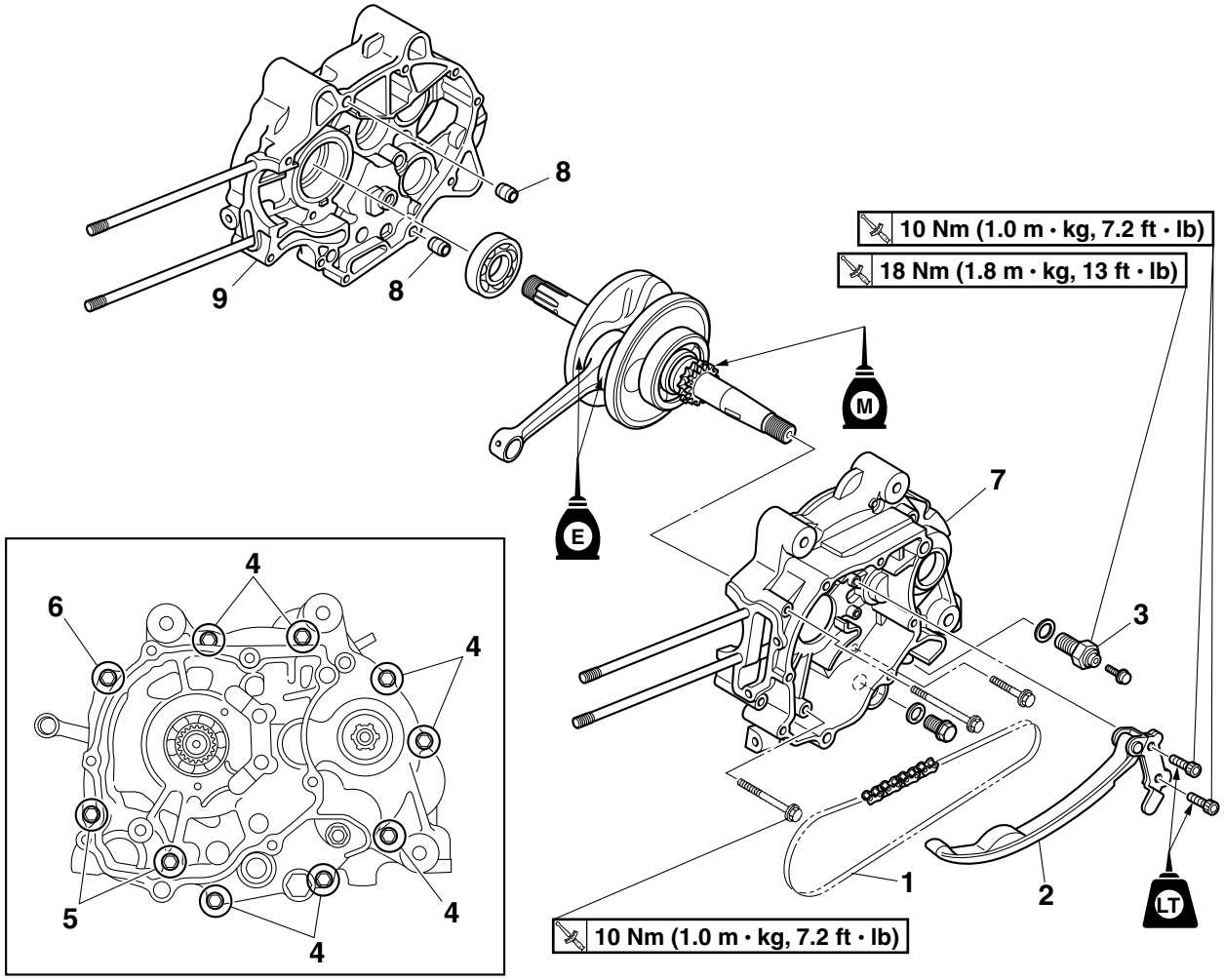
EAS25540
CRANKCASE

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-2.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-5.
	Cylinder/Piston		Refer to "CYLINDER AND PISTON" on page 5-22.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-27.
	AC magneto rotor		Refer to "GENERATOR" on page 5-30.
	Primary drive gear/Primary driven gear		Refer to "CLUTCH" on page 5-37.
	Oil pump assembly		Refer to "OIL PUMP" on page 5-45.
	Shift shaft		Refer to "SHIFT SHAFT" on page 5-43.
1	Timing chain	1	
2	Timing chain guide (intake side)	1	
3	Neutral switch	1	
4	Bolt	7	Length: 40 mm (1.6 in)
5	Bolt	2	Length: 60 mm (2.4 in)
6	Bolt	1	Length: 75 mm (3.0 in)
7	Left crankcase	1	
8	Dowel pin	2	
9	Right crankcase	1	

Separating the crankcase



Order	Job/Parts to remove	Q'ty	Remarks
			For installation, reverse the removal procedure.

EAS25560
DISASSEMBLING THE CRANKCASE
1. Remove:
   • Crankcase bolts

TIP
Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.

2. Remove:
   • Left crankcase

ECA13900
NOTICE
Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

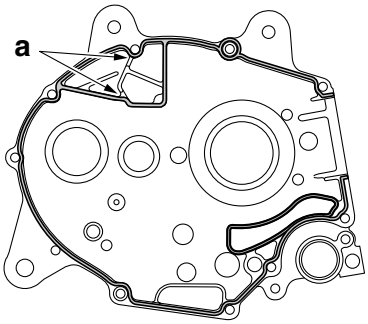
EAS25580
CHECKING THE CRANKCASE
1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
   • Crankcase
   Cracks/damage → Replace.
   • Oil delivery passages
   Obstruction → Blow out with compressed air.

EAS25620
CHECKING THE TIMING CHAIN
1. Check:
   • Timing chain
   Damage/stiffness → Replace the timing chain and camshaft drive sprocket as a set.

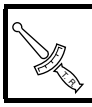
EAS25700
ASSEMBLING THE CRANKCASE
1. Thoroughly clean all the gasket and crankcase mating surfaces.
2. Apply:
   • Sealant
   (onto the crankcase mating surfaces)

	**Yamaha bond No. 1215** **90890-85505** **(Three bond No. 1215®)**

TIP
Do not allow any sealant to come into contact with the oil gallery “a”.



3. Tighten:
   • Crankcase bolts

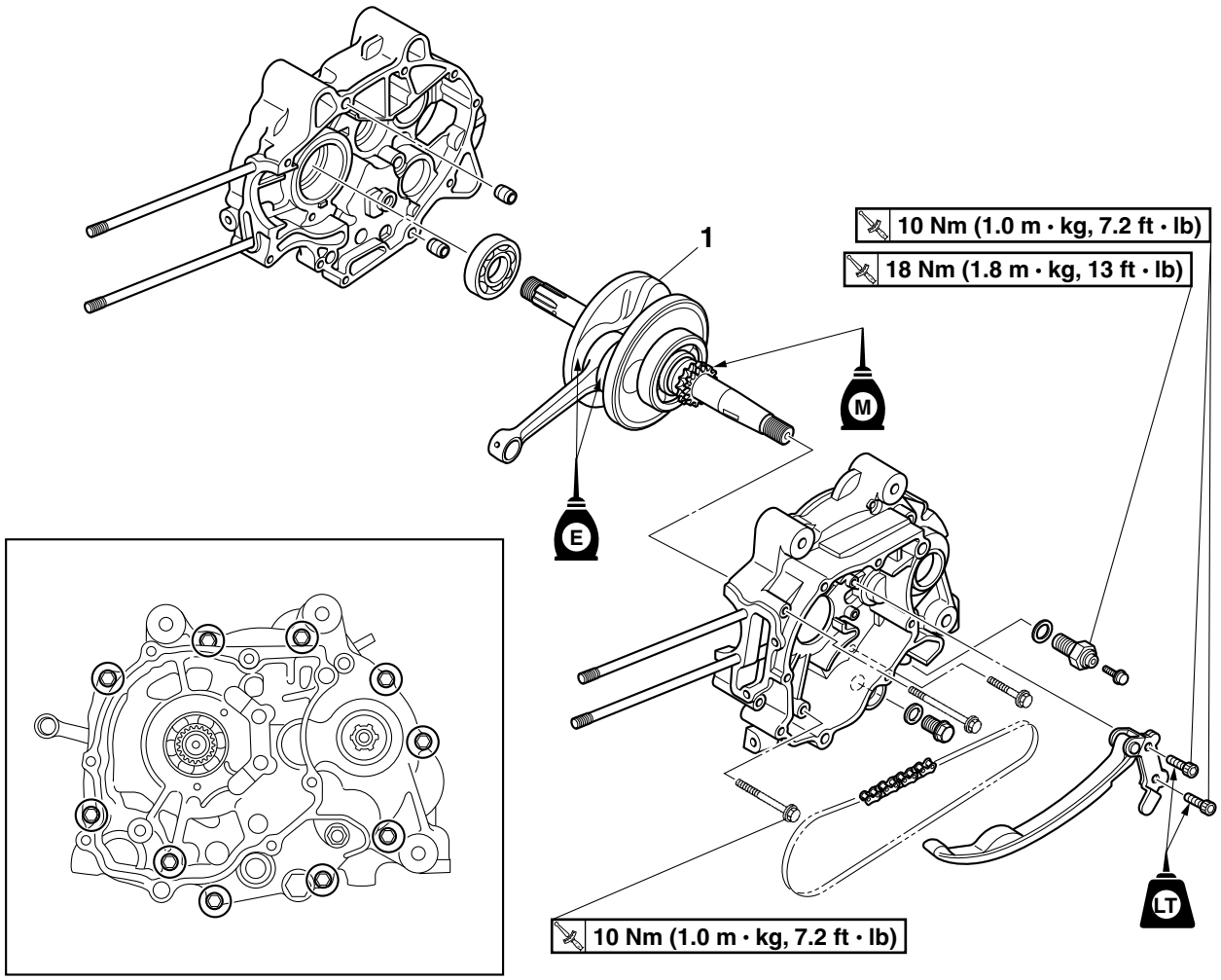
	**Crankcase bolt** **10 Nm (1.0 m·kg, 7.2 ft·lb)**

TIP
Tighten the crankcase bolts in stages and in a crisscross pattern.

EAS25970

CRANKSHAFT

Removing the crankshaft



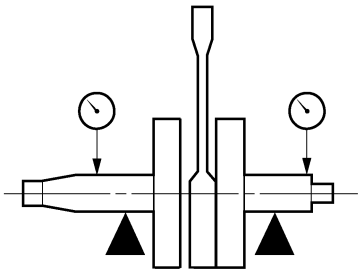
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-48.
1	Crankshaft	1	
			For installation, reverse the removal procedure.

EAS26060
CHECKING THE CRANKSHAFT AND CONNECTING ROD

1. Measure:
   • Crankshaft runout
   Out of specification → Replace the crankshaft, the bearing or both.

TIP
Turn the crankshaft slowly.

Runout limit C
0.030 mm (0.0012 in)



2. Measure:
   • Big end side clearance
   Out of specification → Replace the big end bearing, crankshaft pin, or connecting rod.

Big end side clearance D
0.100–0.400 mm (0.0039–0.0157 in)
Limit
0.50 mm (0.0197 in)

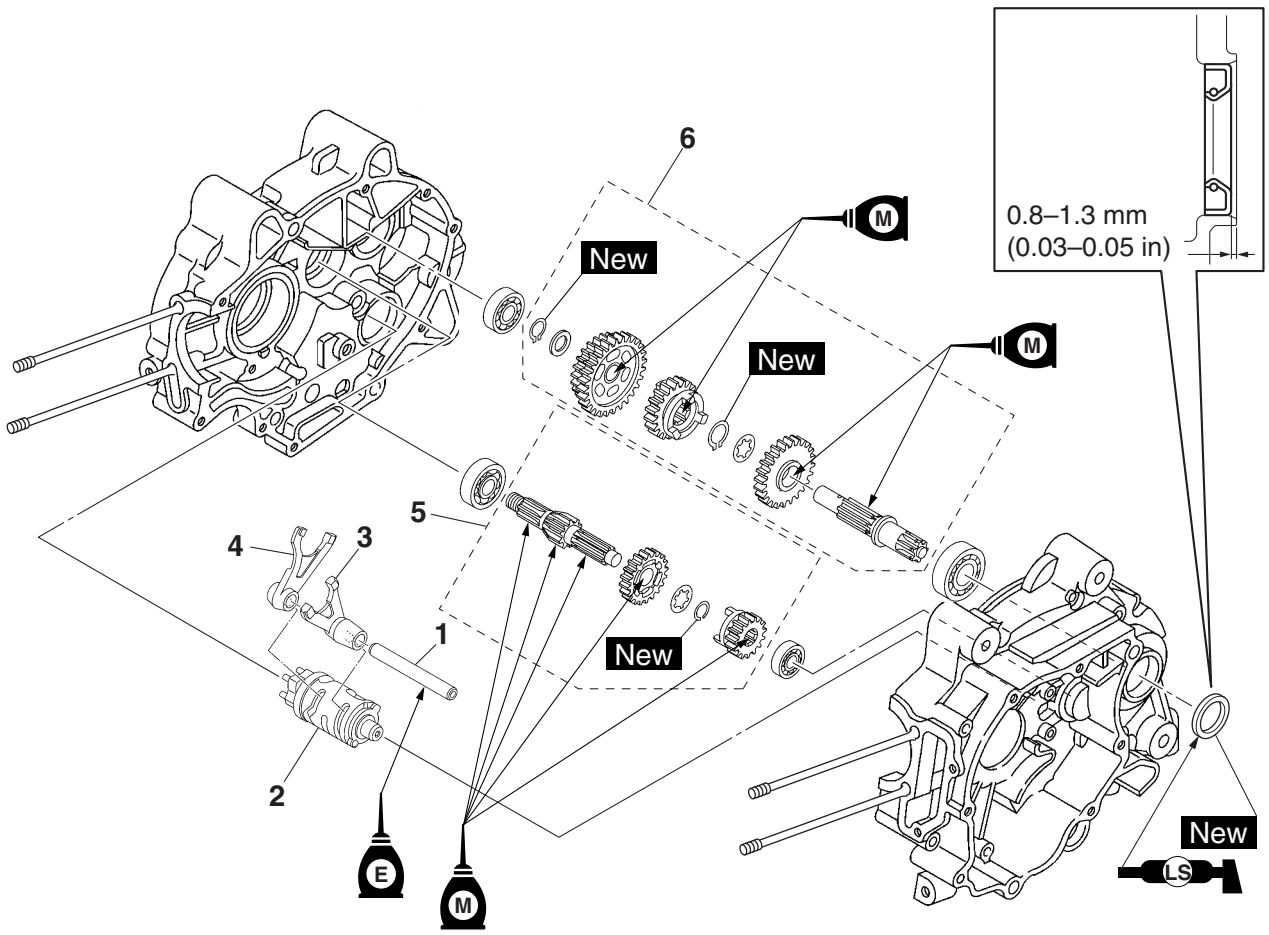
3. Measure:
   • Crankshaft width
   Out of specification → Replace the crankshaft.

Width A
42.95–43.00 mm (1.691–1.693 in)

4. Check:
   • Crankshaft sprocket
   Damage/wear → Replace the crankshaft.
   • Bearing
   Cracks/damage/wear → Replace the crankshaft.
5. Check:
   • Crankshaft journal
   Scratches/wear → Replace the crankshaft.

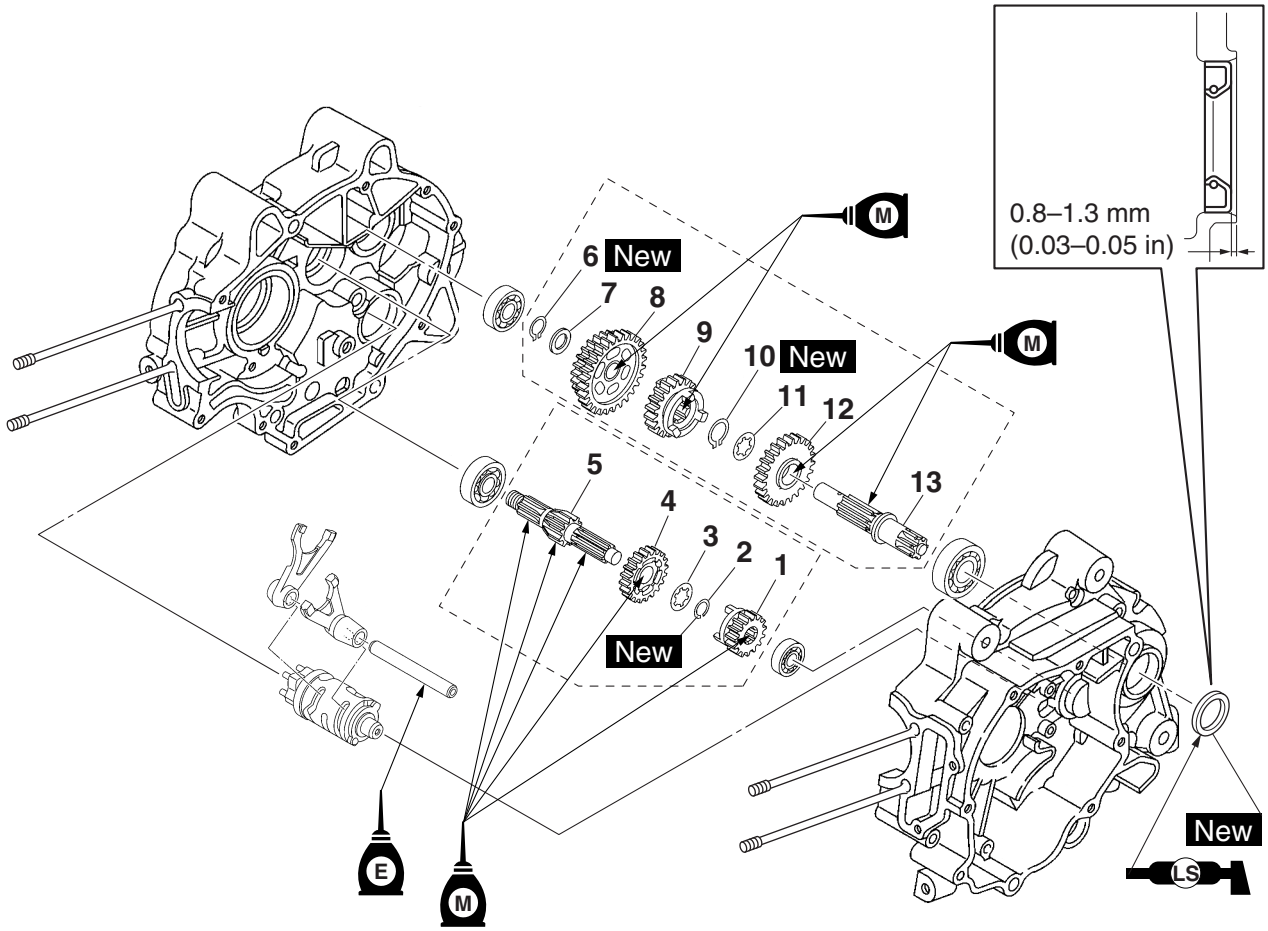
EAS26241
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-48.
1	Shift fork guide bar	1	
2	Shift drum assembly	1	
3	Shift fork-L	1	
4	Shift fork-R	1	
5	Main axle assembly	1	
6	Drive axle assembly	1	
			For installation, reverse the removal procedure.

Disassembling the main axle assembly and drive axle assembly



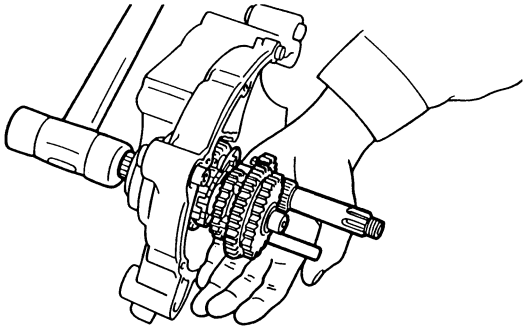
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Circlip	1	
3	Toothed washer	1	
4	3rd pinion gear	1	
5	Main axle/1st pinion gear	1	
6	Circlip	1	
7	Washer	1	
8	1st wheel gear	1	
9	3rd wheel gear	1	
10	Circlip	1	
11	Toothed washer	1	
12	2nd wheel gear	1	
13	Drive axle	1	
			For assembly, reverse the disassembly procedure.

EAS26250
REMOVING THE TRANSMISSION

1. Remove:
   - Shift forks
   - Shift drum assembly
   - Main axle assembly
   - Drive axle assembly

TIP

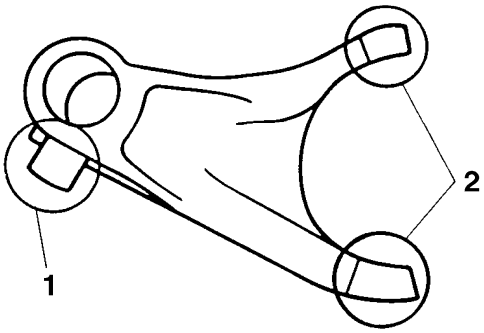
- Remove the main axle, drive axle, shift drum assembly and shift forks all together by tapping lightly on the transmission main axle and shift drum assembly with a soft hammer.
- Remove the assembly carefully. Note the position of each part. Pay particular attention to the location and direction of the shift forks.



EAS26260
CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
   - Shift fork cam follower "1"
   - Shift fork pawl "2"
     Bends/damage/scoring/wear → Replace the shift fork.

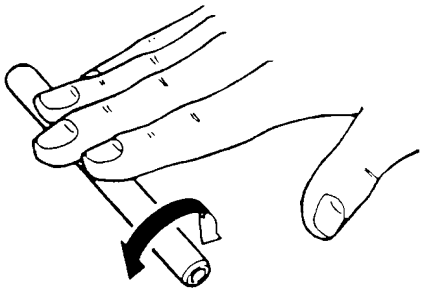


2. Check:
   - Shift fork guide bar
     Roll the shift fork guide bar on a flat surface.
     Bends → Replace.

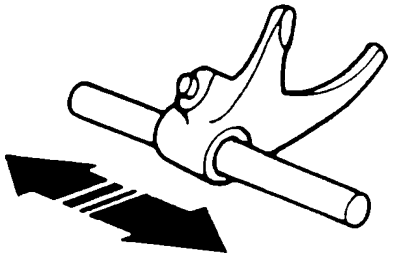
EWA12840

⚠ WARNING

Do not attempt to straighten a bent shift fork guide bar.



3. Check:
   - Shift fork movement
     (along the shift fork guide bar)
     Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS26270
CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - Shift drum groove
     Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment
     Damage/wear → Replace the shift drum assembly.

EAS26280
CHECKING THE TRANSMISSION

1. Measure:
   - Main axle runout
     (with a centering device and dial gauge)
     Out of specification → Replace the main axle.

	Main axle runout limit **0.08 mm (0.0032 in)**

2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge)
     Out of specification → Replace the drive axle.

	Drive axle runout limit **0.08 mm (0.0032 in)**

3. Check:
   - Transmission gears

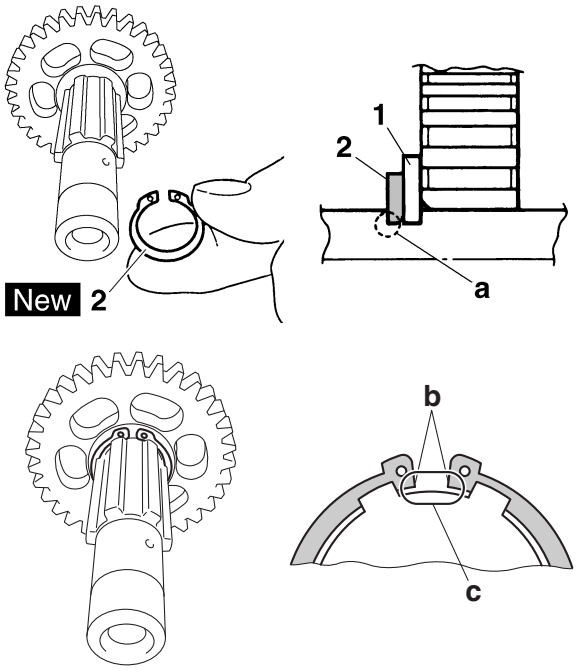
Blue discoloration/pitting/wear → Replace the defective gear(s).
- Transmission gear dogs
  Cracks/damage/rounded edges → Replace the defective gear(s).

4. Check:
   - Transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - Circlips
     Bends/damage/looseness → Replace.

EAS26320
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
   - Toothed washer "1"
   - Circlip "2" New

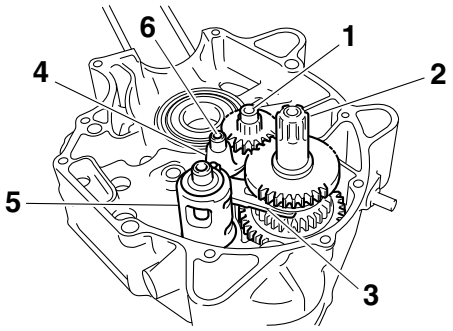
TIP
- Be sure the circlip sharp-edged corner "a" is positioned opposite to the toothed washer and gear.
- Align the opening between the ends "b" of the circlip with a groove "c" in the axle.



EAS26360
INSTALLING THE TRANSMISSION

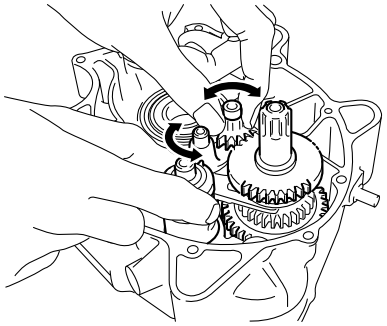
1. Install:
   - Main axle assembly "1"
   - Drive axle assembly "2"
   - Shift fork-R "3"
   - Shift fork-L "4"
   - Shift drum assembly "5"
   - Shift fork guide bar "6"

TIP
- The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "L".
- Mesh the shift fork "R" with the 3rd wheel gear on the drive axle.
- Mesh the shift fork "L" with the 2nd pinion gear on the main axle.



2. Check:
   - Transmission movement
     Rough movement → Repair.

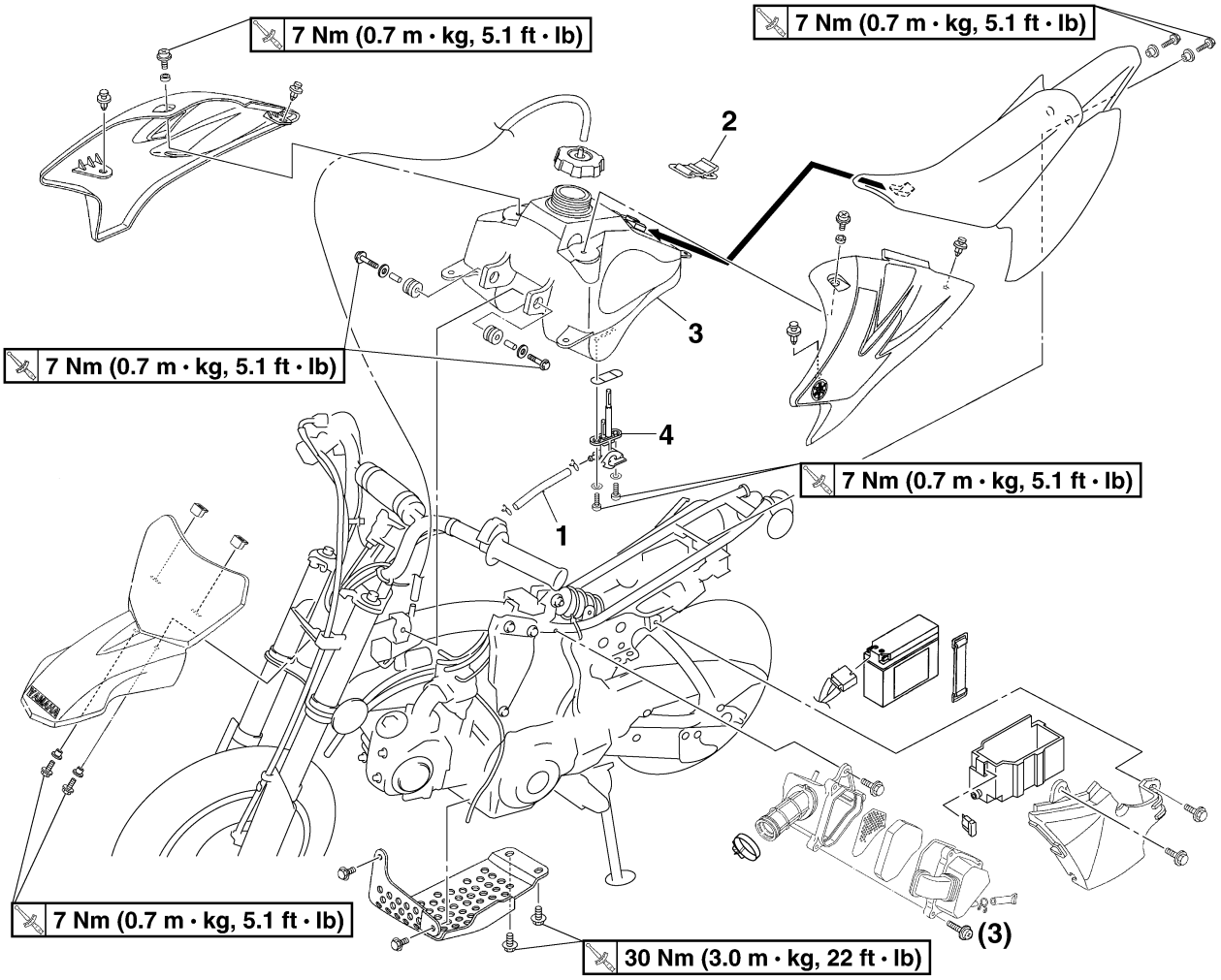
TIP
Oil each gear, shaft, and bearing thoroughly.



FUEL SYSTEM

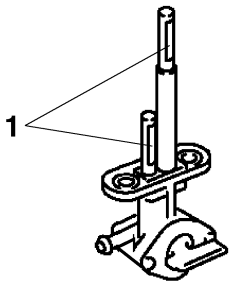
EAS26620
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Seat assembly/Air scoop (left and right)		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel hose	1	Disconnect.
2	Fitting band	1	
3	Fuel tank	1	
4	Fuel cock	1	
			For installation, reverse the removal procedure.

EAS26650
CHECKING THE FUEL COCK
1. Check:
   • Fuel cock
   Cracks/damage/wear → Replace.
2. Check:
   • Fuel cock strainer "1"
   Obstruction → Clean.
   Blow out with compressed air.
   Damage → Replace.



EAS26660
CHECKING THE FUEL COCK OPERATION
TIP
After installing the fuel cock, check its operation.

1. Check:
   • Fuel cock operation
   Out of specification → Replace the fuel cock.

Fuel flows.
Fuel cock is ON or RES.
Fuel does not flow.
Fuel cock is OFF.

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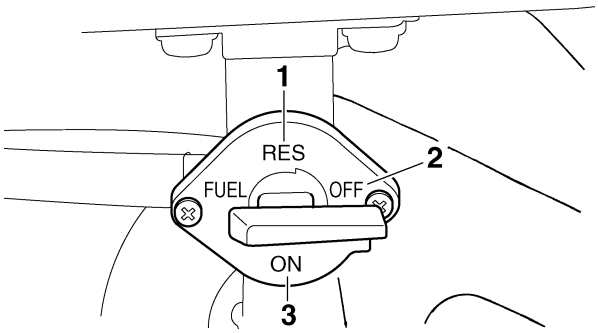
a. Place a container under the end of the fuel hose.
b. Check that the fuel cock lever is turned to "ON" or "RES".



1. "RES"
2. "OFF"
3. "ON"

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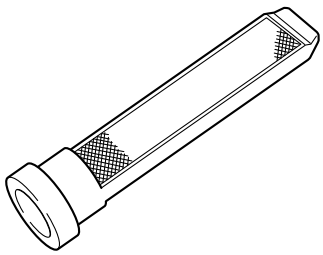
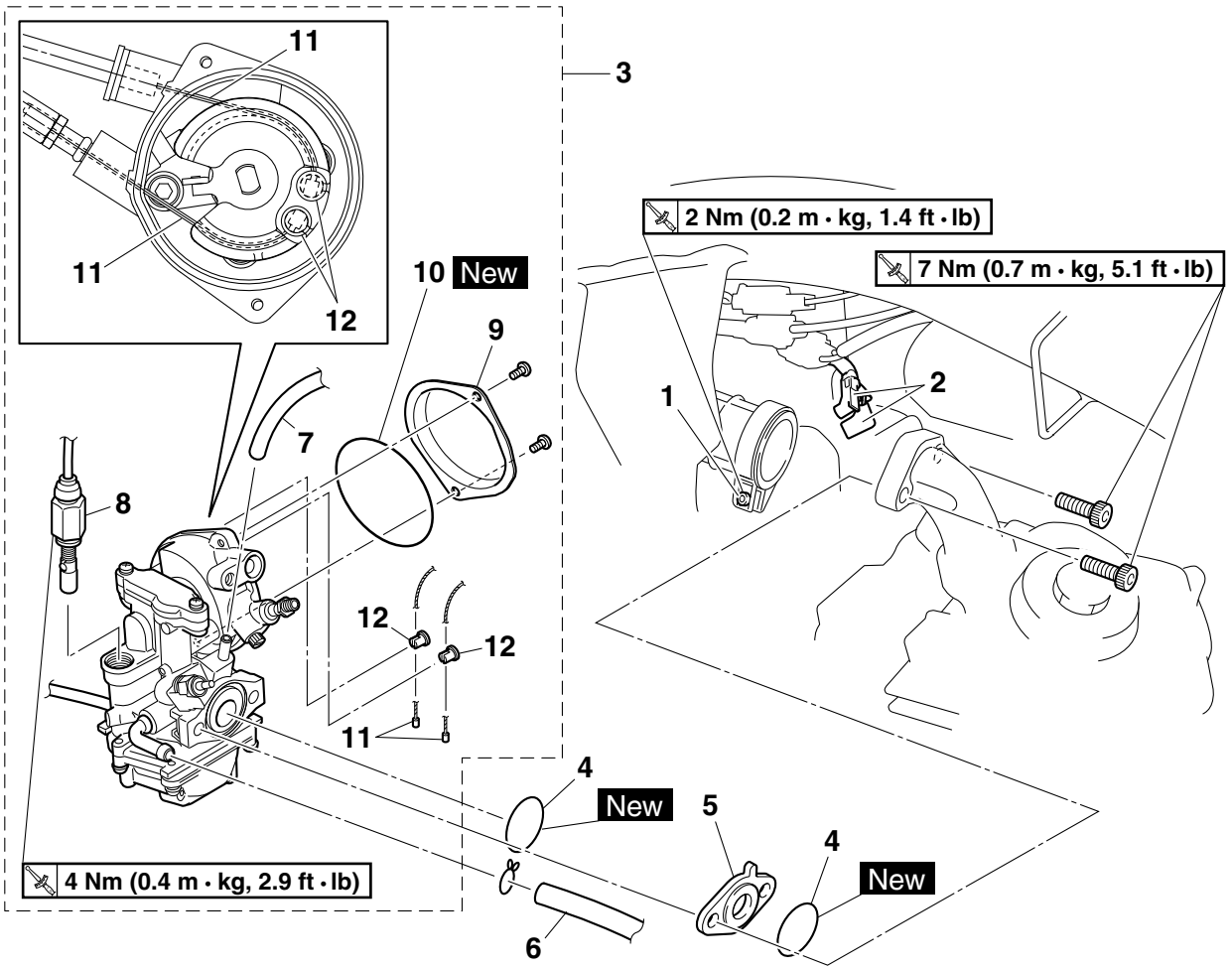
EAS1P6U708
CHECKING THE FUEL FILTER
1. Check:
   • Fuel filter
   Damage → Replace.
   Obstruction → Clean.



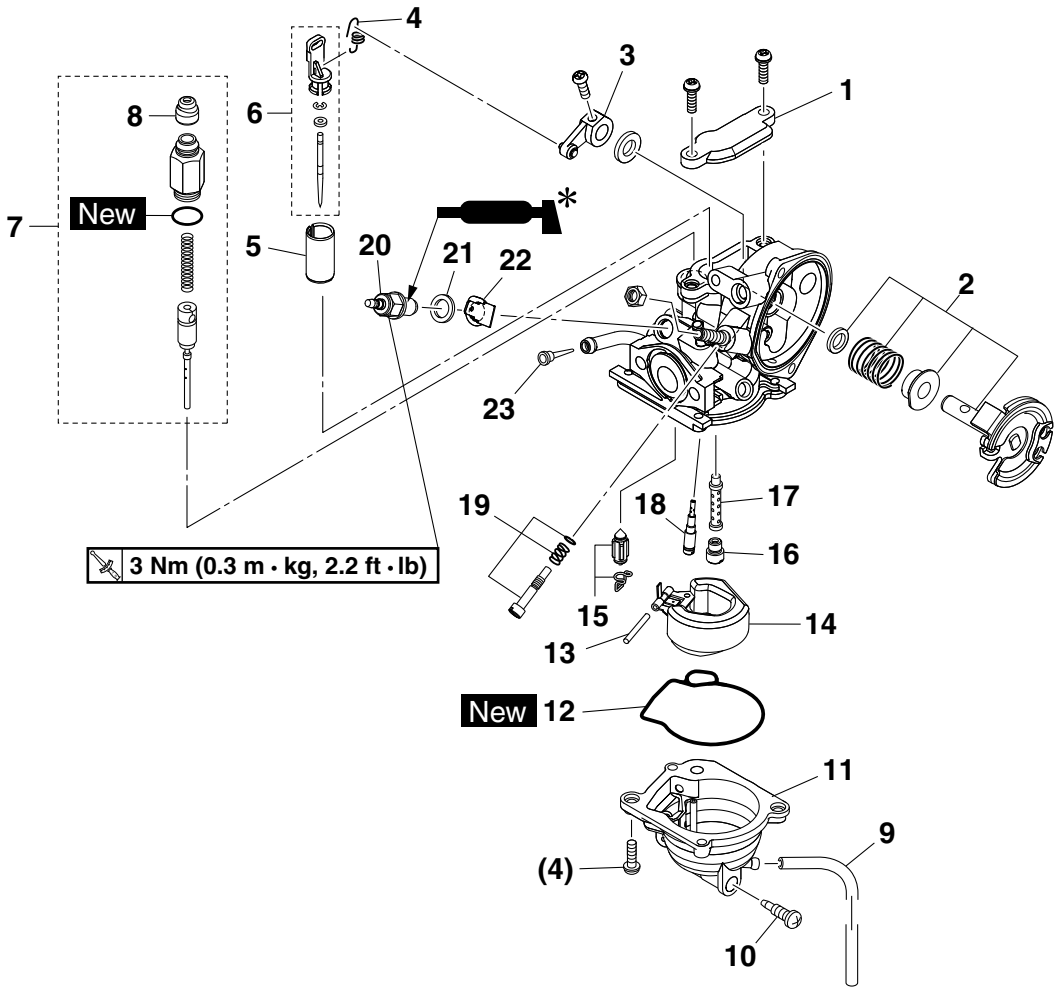
EAS26720
CARBURETOR

Removing the carburetor



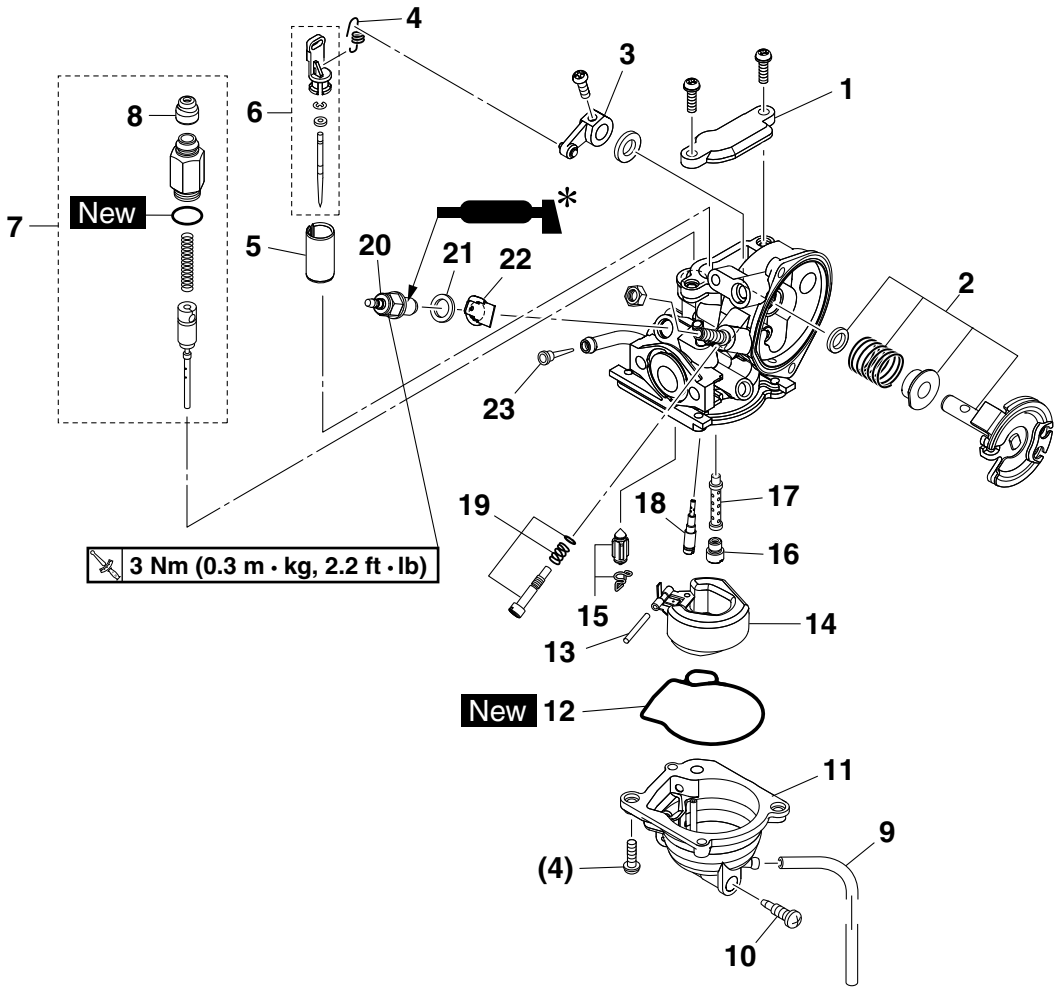
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 6-1.
1	Air filter joint clamp screw	1	Loosen.
2	Carburetor warmer lead connector	2	Disconnect.
3	Carburetor assembly	1	
4	O-ring	2	
5	Carburetor joint	1	
6	Fuel hose	1	
7	Air vent hose	1	Disconnect.
8	Starter plunger assembly	1	
9	Throttle shaft case cover	1	
10	O-ring	1	
11	Throttle cable	2	Disconnect.
12	Throttle cable end	2	
			For installation, reverse the removal procedure.

Disassembling the carburetor



Order	Job/Parts to remove	Q'ty	Remarks
1	Lever cover	1	
2	Throttle shaft assembly	1	
3	Lever assembly	1	
4	Spring	1	
5	Throttle valve	1	
6	Jet needle assembly	1	
7	Starter plunger assembly	1	
8	Plunger cap cover	1	
9	Carburetor overflow hose	1	
10	Fuel drain screw	1	
11	Float chamber	1	
12	Float chamber rubber gasket	1	
13	Float pin	1	
14	Float	1	
15	Needle valve set	1	
16	Main jet	1	
17	Needle jet	1	
18	Pilot jet	1	
19	Throttle stop screw set	1	
20	Carburetor warmer	1	

Disassembling the carburetor



Order	Job/Parts to remove	Q'ty	Remarks
21	Carburetor warmer gasket	1	
22	Carburetor warmer terminal	1	
23	Fuel filter	1	
			For assembly, reverse the disassembly procedure.

* Apply HEAT SINKER.

EAS26760
CHECKING THE CARBURETOR

1. Check:
   • Carburetor body
   • Float chamber
   • Jet housing
   Cracks/damage → Replace.
2. Check:
   • Fuel passages
   Obstruction → Clean.

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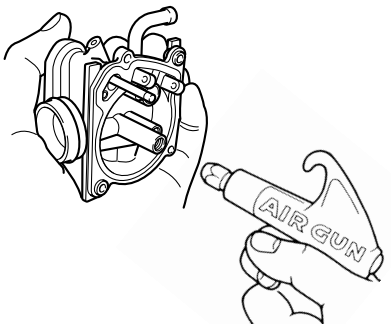
a. Wash the carburetor in a petroleum-based solvent. Do not use any caustic carburetor cleaning solution.
b. Blow out all of the passages and jets with compressed air.



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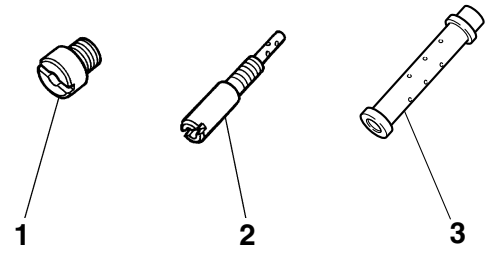
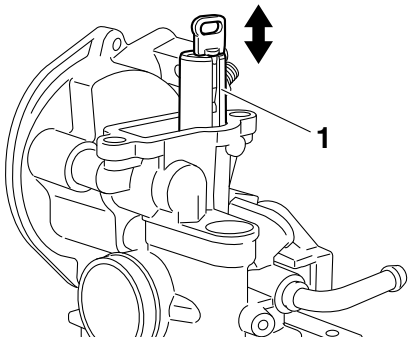
3. Check:
   • Float chamber body
   Dirt → Clean.
4. Check:
   • Float
   Damage → Replace.
5. Check:
   • Needle valve
   • Needle valve seat
   Damage/obstruction/wear → Replace the needle valve or carburetor assembly.
6. Check:
   • Jet needle assembly
   • Main jet “1”
   • Pilot jet “2”
   • Needle jet “3”
   Bends/damage/wear → Replace.
   Obstruction → Clean.
   Blow out the jets with compressed air.



7. Check:
   • Throttle valve movement
   Insert the throttle valve “1” into the carburetor body and move it up and down.
   Tightness → Replace the throttle valve.



8. Check:
   • Starter plunger
   • Starter plunger spring
   Bends/cracks/damage → Replace.
9. Check:
   • Carburetor overflow hose
   • Fuel hoses
   Cracks/damage/wear → Replace.
   Obstruction → Clean.
   Blow out the hoses with compressed air.
10. Check:
   • Fuel filter
   Damage → Replace.
   Obstruction → Clean.

EAS26800
ASSEMBLING THE CARBURETOR

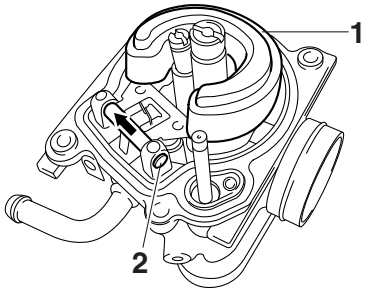
ECA14110
NOTICE

• Before assembling the carburetor, wash all of the parts in a petroleum-based solvent.
• Always use a new gasket.

1. Install:
   • Needle valve
   • Float “1”
   • Float pin “2”

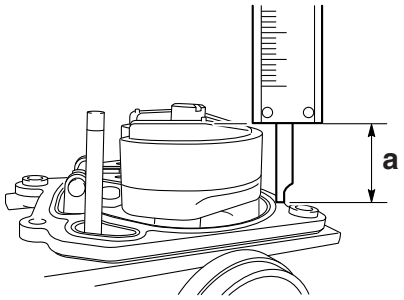
TIP
Install the float pin in the direction of the arrow

shown in the illustration.



2. Measure:
   • Float height "a"
   Out of specification → Adjust.

	Float height **18.5 mm (0.73 in)**



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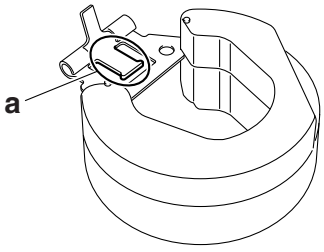
a. Hold the carburetor in an upside down position.
b. Measure the distance from the front mating surface of the float chamber (gasket removed) to the top of the float.

TIP

The float arm should be resting on the needle valve, but not compressing it.

c. If the float height is not within the specification, check the valve seat and needle valve.
d. If either is worn, replace the carburetor assembly or needle valve.
e. If both are fine, adjust the float height by bending the float tang "a" on the float.



f. Recheck the float height.

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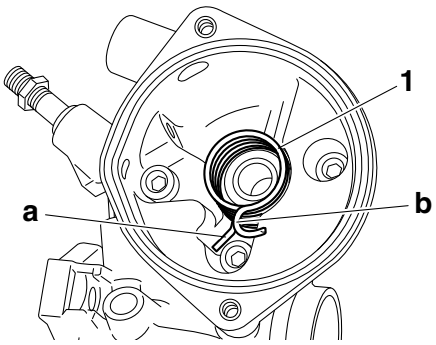
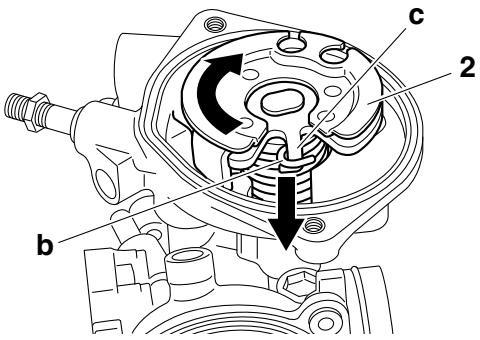
3. Install:
   • Dust seal
   • Return spring "1"
   • Spacer
   • Throttle shaft "2"

TIP

• Insert the straight end "a" of return spring "1" into the throttle shaft case as shown in the illustration.
• Install the return spring curved end "b" into the projection "c" in the throttle shaft, and then turn the throttle shaft clockwise.





EAS26890

INSTALLING THE CARBURETOR

1. Adjust:
   • Engine idling speed
   Refer to "ADJUSTING THE ENGINE IDLING SPEED" on page 3-7.

	Engine idling speed **1600–1800 r/min**

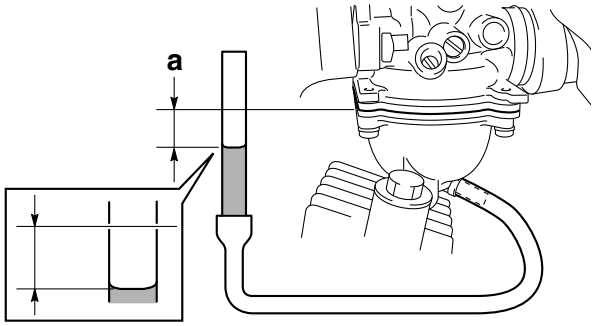
2. Adjust:
   • Throttle grip free play
   Refer to "CHECKING THE THROTTLE GRIP OPERATION" on page 3-18.

	Throttle grip free play **3.0–5.0 mm (0.12–0.20 in)**

EAS26910
MEASURING AND ADJUSTING THE FUEL LEVEL

1. Measure:
   • Fuel level “a”
   Out of specification → Adjust.

Fuel level A (using fuel level gauge)
2.0–3.0 mm (0.08–0.12 in)



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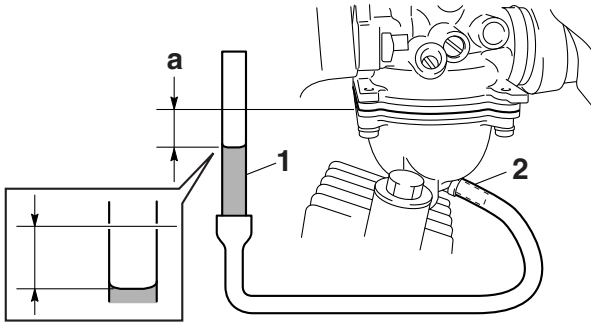
a. Stand the vehicle on a level surface.
b. Place the vehicle on a suitable stand to ensure that the vehicle is standing straight up.
c. Install the fuel level gauge “1” onto the fuel drain pipe “2”.

Fuel level gauge
90890-01312
YM-01312-A

d. Loosen the fuel drain screw.
e. Hold the fuel level gauge vertically next to the line on the float chamber.
f. Measure the fuel level “a”.



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2. Adjust:
   • Fuel level

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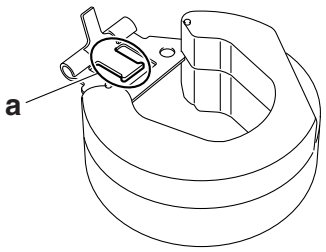
a. Remove the carburetor assembly.
b. Check the needle valve seat and needle valve.
c. If either is worn, replace the carburetor assembly or needle valve.
d. If both are fine, adjust the float level by slightly bending the float tang “a”.



e. Install the carburetor assembly.
f. Measure the fuel level again.
g. Repeat steps (a) to (f) until the fuel level is within specification.

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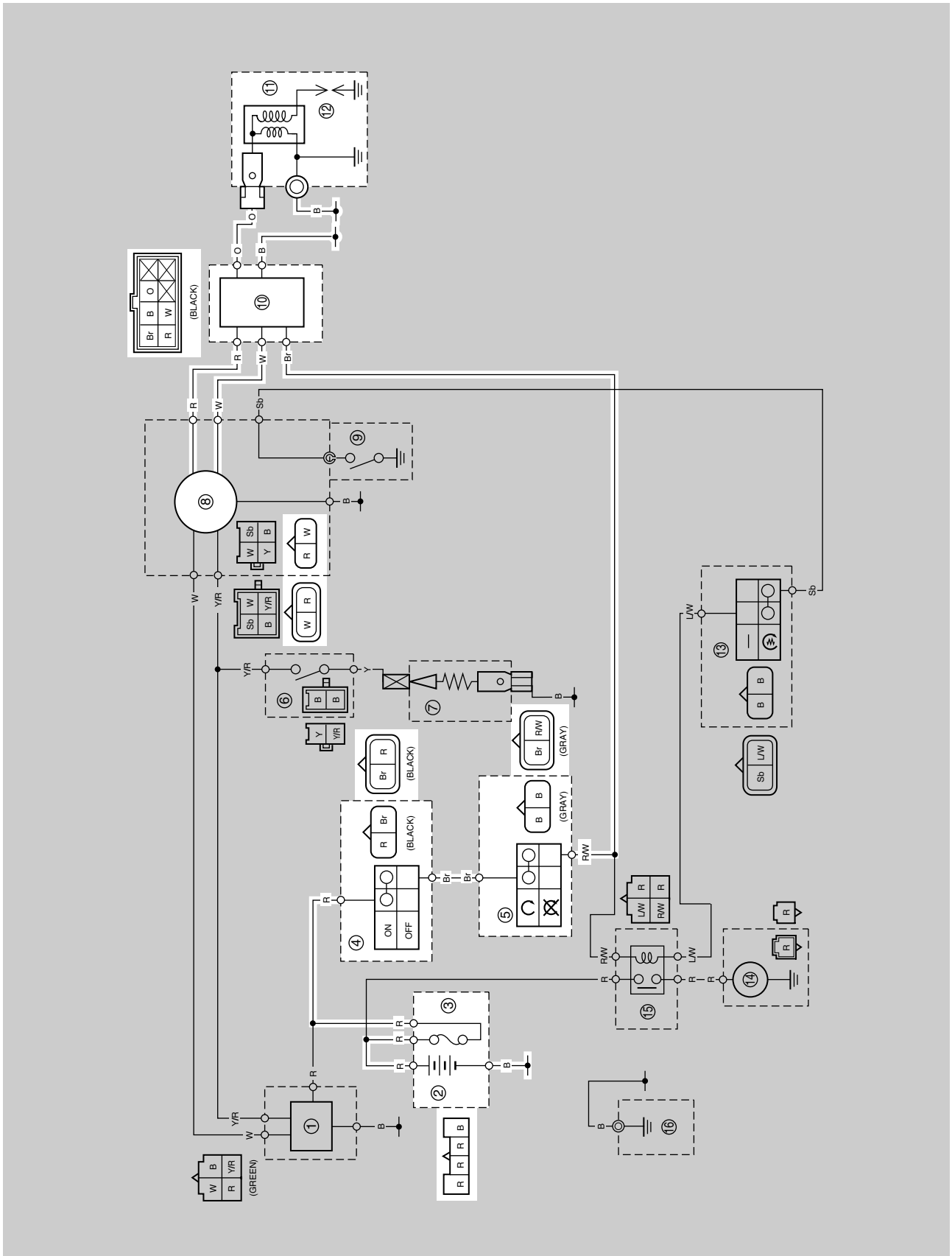
ELECTRICAL SYSTEM

EAS27090
IGNITION SYSTEM

EAS27100
CIRCUIT DIAGRAM



2. Battery
3. Fuse
4. Main switch
5. Engine stop switch
8. AC magneto
10. CDI unit
11. Ignition coil
12. Spark plug

EAS27131
TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

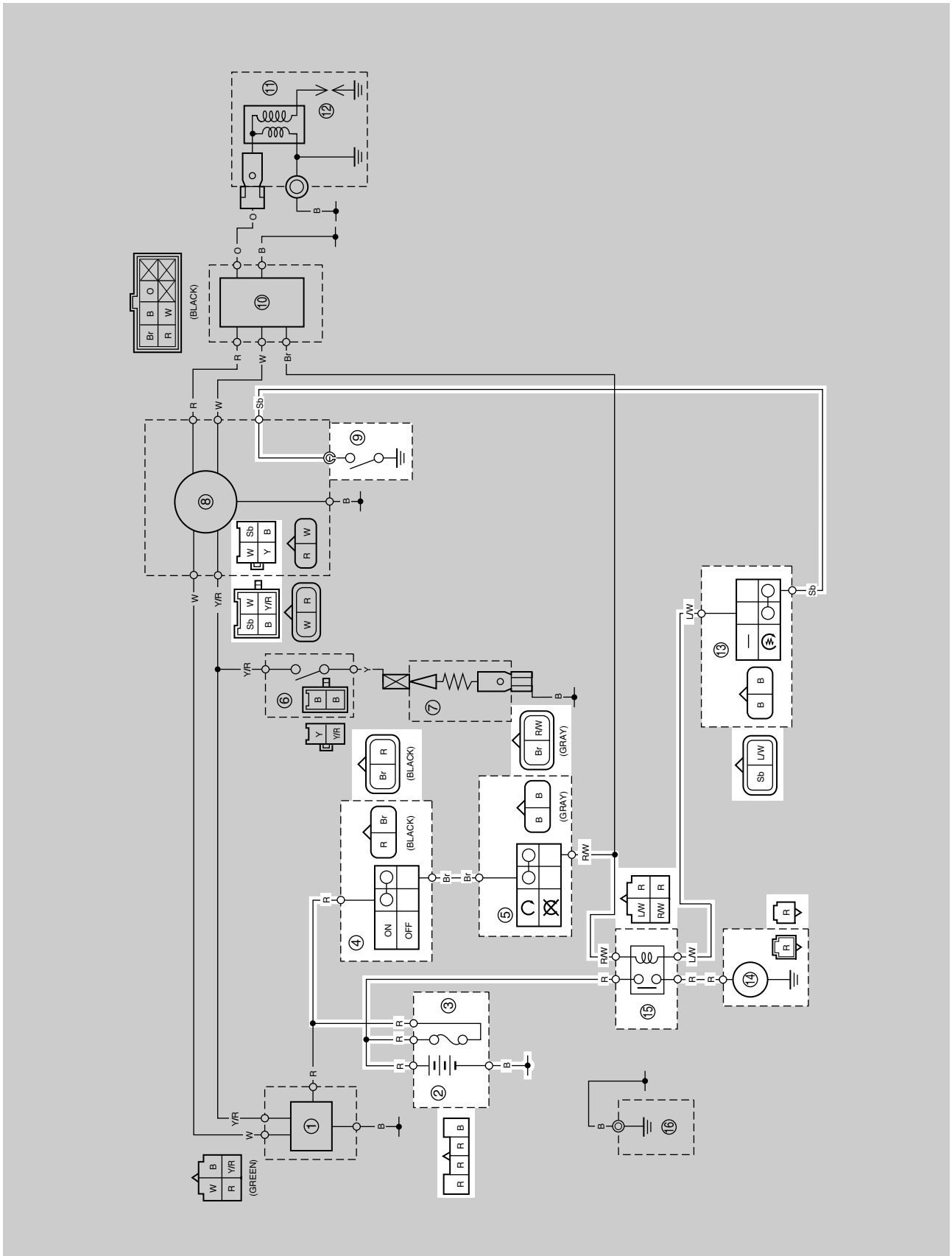
TIP

• Before troubleshooting, remove the following part(s):
1. Seat assembly
2. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSES" on page 7-22.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-22.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the spark plug. Refer to "CHECKING THE SPARK PLUG" on page 3-3.	NG→	Re-gap or replace the spark plug.
OK↓		
4. Check the spark plug cap. Refer to "CHECKING THE SPARK PLUG CAP" on page 7-25.	NG→	Replace the spark plug cap.
OK↓		
5. Check the ignition coil. Refer to "CHECKING THE IGNITION COIL" on page 7-26.	NG→	Replace the ignition coil.
OK↓		
6. Check the pickup coil. Refer to "CHECKING THE PICKUP COIL" on page 7-27.	NG→	Replace the pickup coil/stator assembly.
OK↓		
7. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 7-19.	NG→	Replace the main switch.
OK↓		
8. Check the engine stop switch. Refer to "CHECKING THE SWITCHES" on page 7-19.	NG→	Replace the engine stop switch.
OK↓		
9. Check the entire ignition system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-1.	NG→	Properly connect or repair the ignition system's wiring
OK↓		
Replace the CDI unit.		

EAS27160
ELECTRIC STARTING SYSTEM

EAS27170
CIRCUIT DIAGRAM



2. Battery
3. Fuse
4. Main switch
5. Engine stop switch
9. Neutral switch
13. Start switch
14. Starter motor
15. Starter relay

EAS27190
TROUBLESHOOTING

The starter motor fails to turn.

TIP

• Before troubleshooting, remove the following part(s):
1. Seat assembly
2. Fuel tank
3. Drive sprocket cover
4. Engine guard

1. Check the fuse. Refer to “CHECKING THE FUSES” on page 7-22.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 7-22.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 7-27.	OK→	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG↓		
4. Check the starter motor. Refer to “CHECKING THE STARTER MOTOR” on page 5-28.	NG→	Repair or replace the starter motor.
OK↓		
5. Check the starter relay. Refer to “CHECKING THE RELAY” on page 7-25.	NG→	Replace the starter relay.
OK↓		
6. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 7-19.	NG→	Replace the main switch.
OK↓		
7. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 7-19.	NG→	Replace the engine stop switch.
OK↓		
8. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 7-19.	NG→	Replace the neutral switch.
OK↓		

9. Check the start switch.
   Refer to “CHECKING THE SWITCHES” on page 7-19.

NG→ Replace the start switch.

OK↓

10. Check the entire starting system wiring.
    Refer to “CIRCUIT DIAGRAM” on page 7-5.

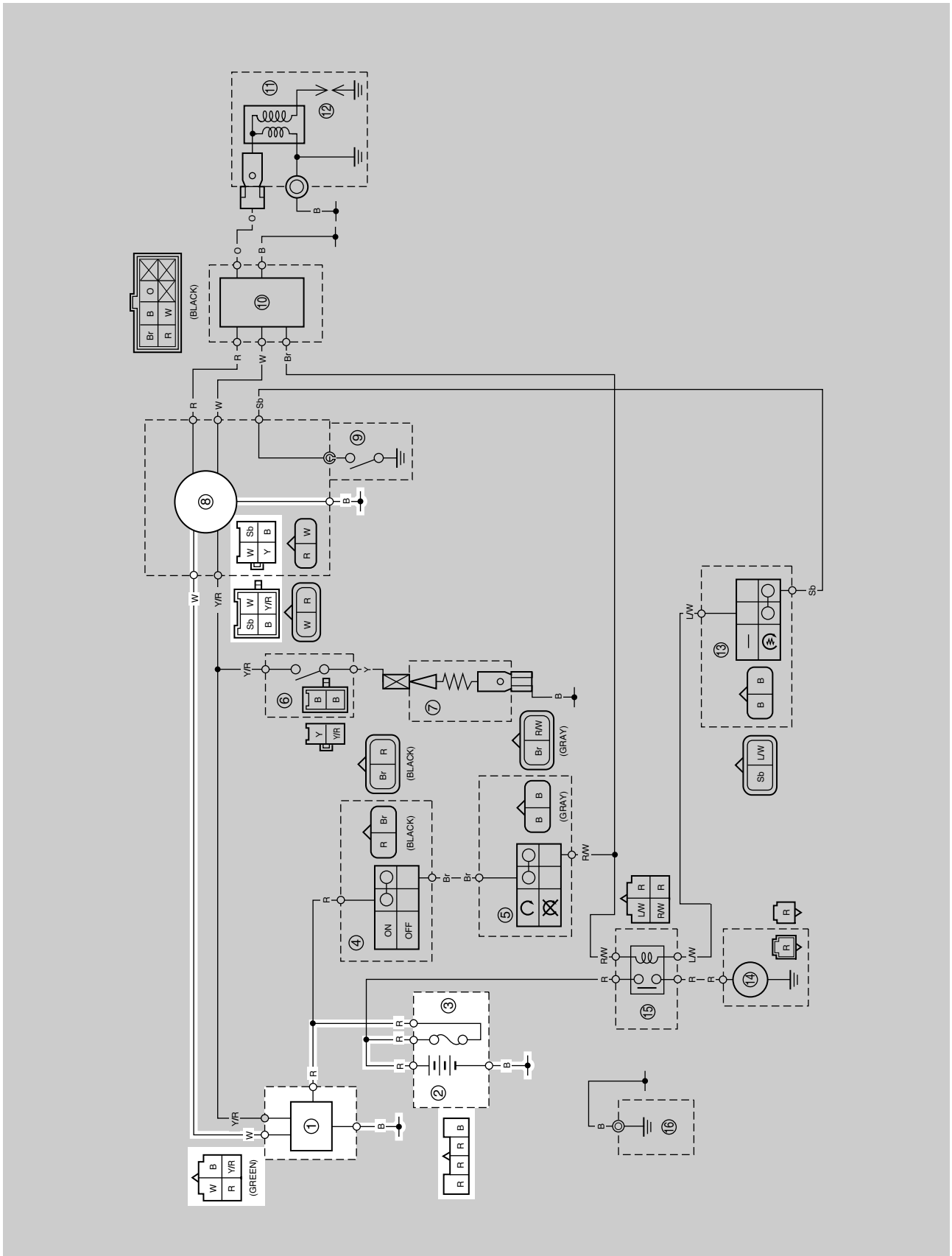
NG→ Properly connect or repair the starting system wiring.

OK↓

The starting system circuit is OK.

EAS27200
CHARGING SYSTEM

EAS27210
CIRCUIT DIAGRAM



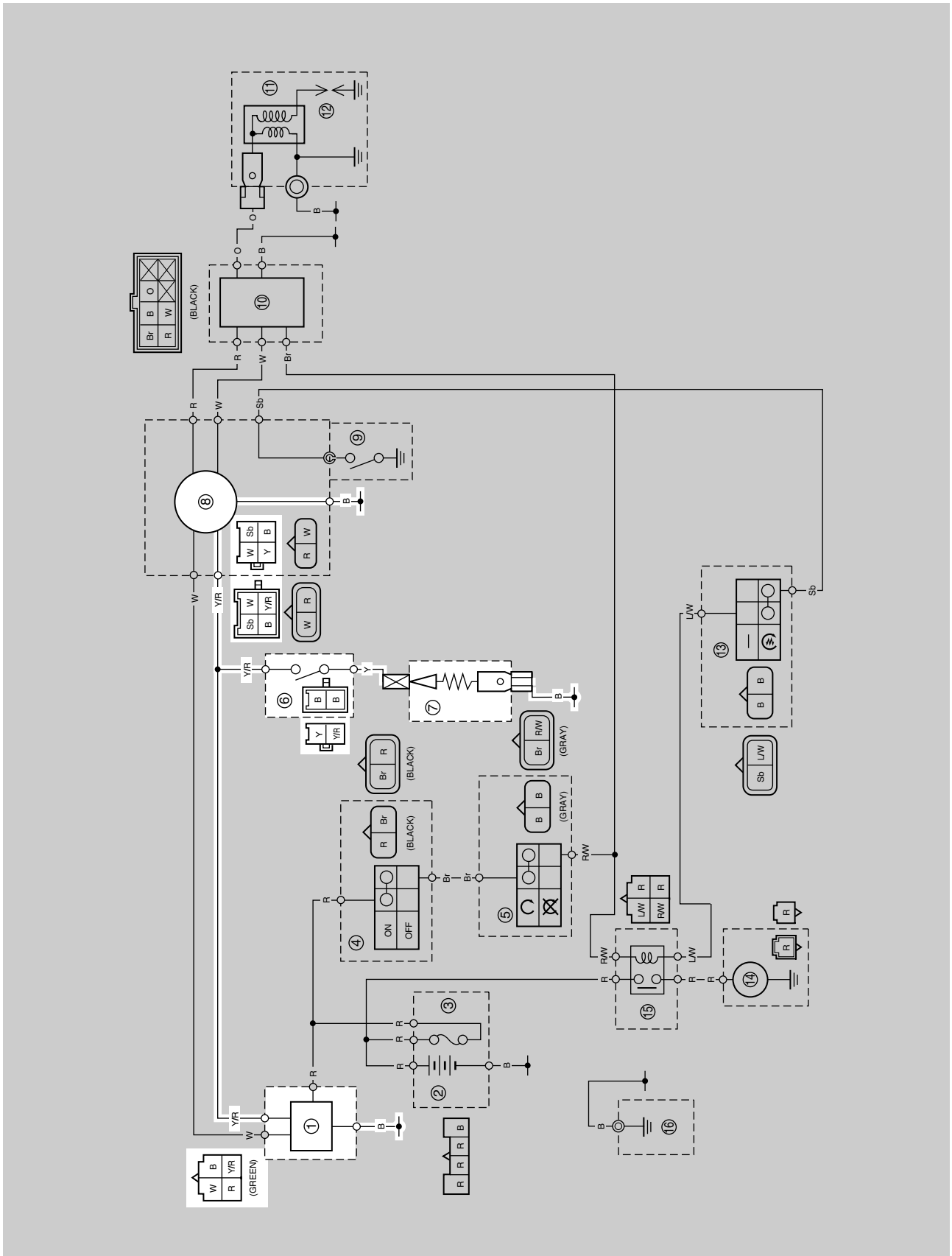
1. Rectifier/regulator
2. Battery
3. Fuse
8. AC magneto

EAS27230
TROUBLESHOOTING
The battery is not being charged.
TIP
• Before troubleshooting, remove the following part(s):
1. Seat assembly
2. Fuel tank

1. Check the fuse. Refer to "CHECKING THE FUSES" on page 7-22.	NG→	Replace the fuse.
OK↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 7-22.	NG→	• Clean the battery terminals. • Recharge or replace the battery.
OK↓		
3. Check the charging coil. Refer to "CHECKING THE CHARGING COIL" on page 7-28.	NG→	Replace the pickup coil/stator assembly.
OK↓		
4. Check the rectifier/regulator. Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 7-28.	NG→	Replace the rectifier/regulator.
OK↓		
5. Check the entire charging system wiring. Refer to "CIRCUIT DIAGRAM" on page 7-9.	NG→	Properly connect or repair the charging system wiring.
OK↓		
The charging system circuit is OK.		

EAS27490
CARBURETOR HEATING SYSTEM

EAS27500
CIRCUIT DIAGRAM



1. Rectifier/regulator
6. Thermo switch
7. Carburetor warmer
8. AC magneto

EAS27510

TROUBLESHOOTING

The carburetor heating system fails to operate.

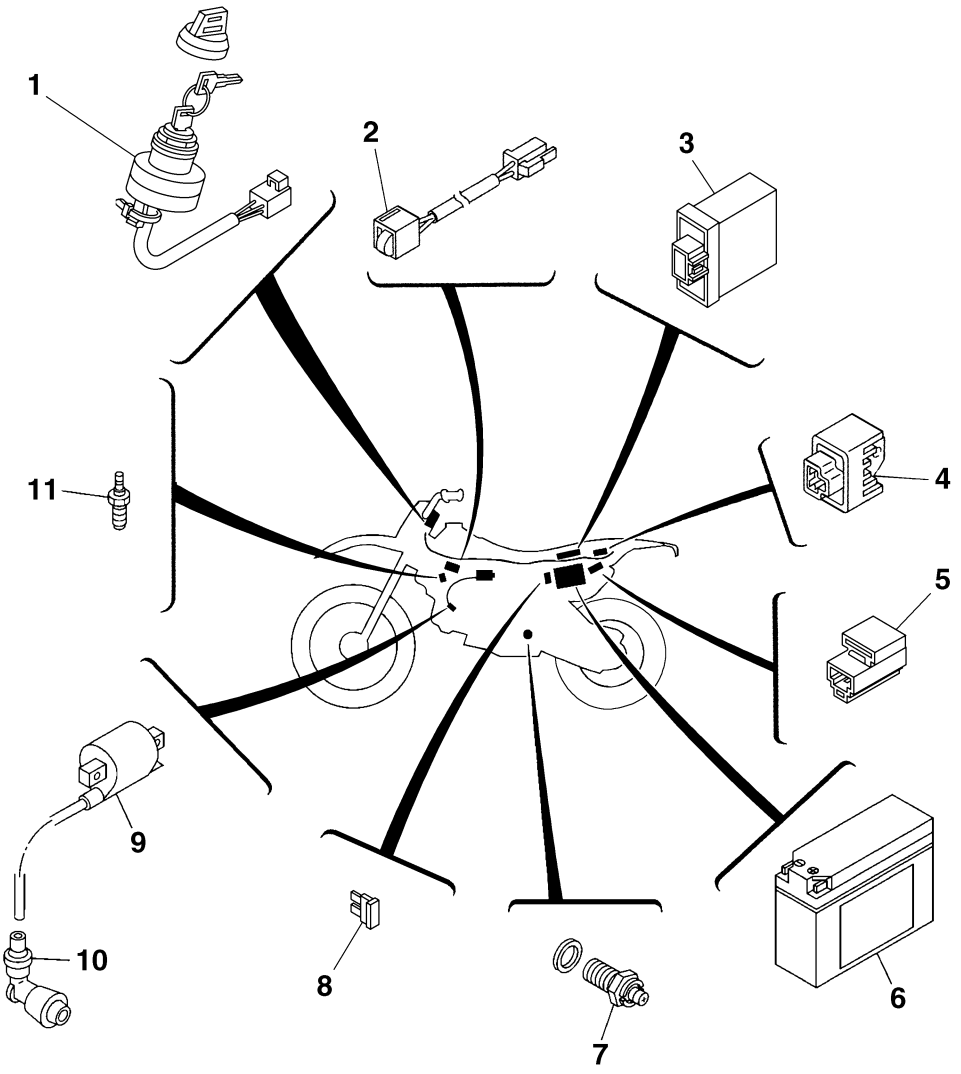
TIP

• Before troubleshooting, remove the following part(s):
1. Seat assembly
2. Fuel tank
3. Carburetor

1. Check the lighting coil.
   Refer to "CHECKING THE LIGHTING COIL" on page 7-27.
   NG→ Replace the pickup coil/stator assembly.
   OK↓
2. Check the thermo switch.
   Refer to "CHECKING THE THERMO SWITCH" on page 7-28.
   NG→ Replace the thermo switch.
   OK↓
3. Check the carburetor warmer.
   Refer to "CHECKING THE CARBURETOR WARMER" on page 7-29.
   NG→ Replace the carburetor warmer.
   OK↓
4. Check the rectifier/regulator.
   Refer to "CHECKING THE RECTIFIER/REGULATOR" on page 7-28.
   NG→ Replace the rectifier/regulator.
   OK↓
5. Check the entire carburetor heating system wiring.
   Refer to "CIRCUIT DIAGRAM" on page 7-13.
   NG→ Properly connect or repair the carburetor heating system wiring.
   OK↓

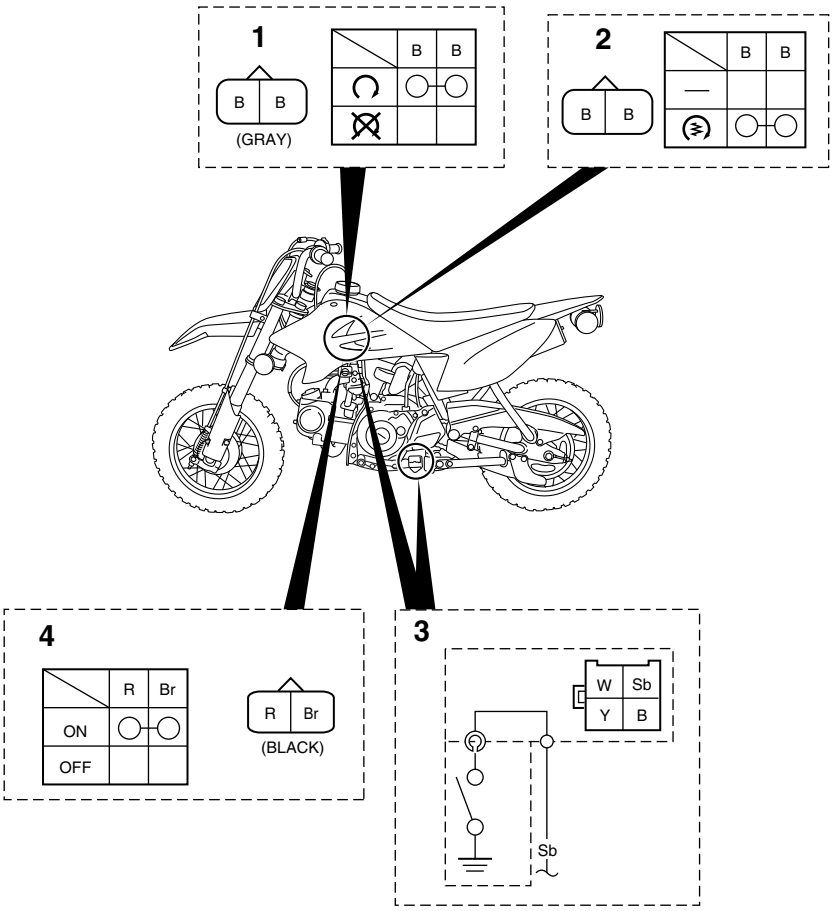
This carburetor heating system circuit is OK.

EAS27973
ELECTRICAL COMPONENTS



1. Main switch
2. Thermo switch
3. CDI unit
4. Rectifier/regulator
5. Starter relay
6. Battery
7. Neutral switch
8. Fuse
9. Ignition coil
10. Spark plug cap
11. Carburetor warmer

EAS27981
CHECKING THE SWITCHES



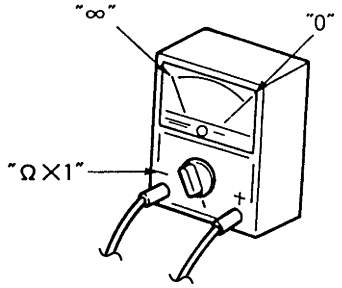
1. Engine stop switch
2. Start switch
3. Neutral switch
4. Main switch

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

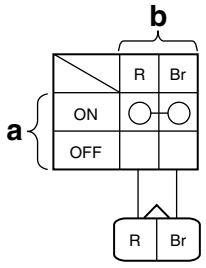
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

- Before checking for continuity, set the pocket tester to "0" and to the "Ω × 1" range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions "a" are shown in the far left column and the switch lead colors "b" are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by "○——○".
There is continuity between red and brown when the switch is set to "OFF".



EAS28000
CHECKING THE FUSES

The following procedure applies to all of the fuse.

ECA13680
NOTICE

To avoid a short circuit, always set the main switch to "OFF" when checking or replacing a fuse.

1. Remove:
   - Seat assembly
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   - Fuse

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a. Connect the pocket tester to the fuse and check the continuity.

TIP

Set the pocket tester selector to "Ω × 1".

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

b. If the pocket tester indicates "∞", replace the fuse.

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3. Replace:
   - Blown fuse

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a. Set the main switch to "OFF".
b. Install a new fuse of the correct amperage rating.
c. Set on the switches to verify if the electrical circuits are operational.
d. If the fuse immediately blows again, check the electrical circuits.

Items	Amperage rating	Q'ty
Fuse	10 A	1
Spare fuse	10 A	1

EWA13310
⚠ WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electrical system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   - Seat assembly
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS28031
CHECKING AND CHARGING THE BATTERY

EWA13290
⚠ WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:
- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL
- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL
- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

ECA13661
NOTICE

- **This is a VRLA (Valve Regulated Lead Acid) battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for a VRLA (Valve Regulated Lead Acid) battery are different from those of conventional batteries. The VRLA (Valve Regulated Lead Acid) battery should be charged according to the appropriate charging method. If the battery is over-**

charged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.

TIP

Since VRLA (Valve Regulated Lead Acid) batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
   - Seat assembly
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery coupler
     (from the battery terminals)
3. Remove:
   - Battery
     Refer to "GENERAL CHASSIS" on page 4-1.
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

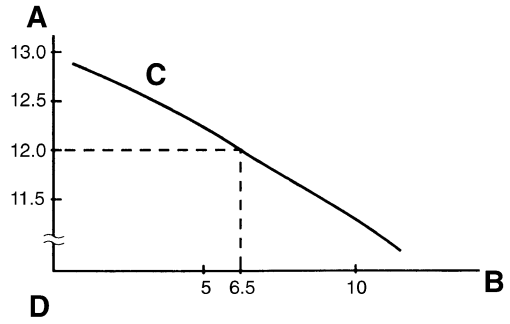
• Positive tester probe → positive battery terminal • Negative tester probe → negative battery terminal

TIP

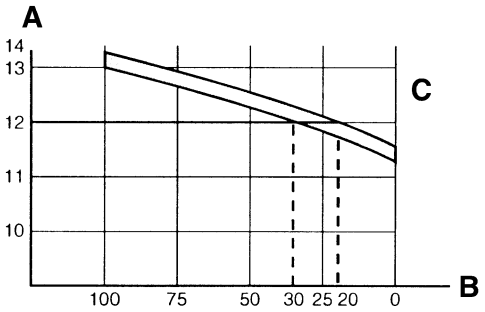
- The charge state of a VRLA (Valve Regulated Lead Acid) battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example Open-circuit voltage = 12.0 V Charging time = 6.5 hours Charge of the battery = 20–30 %



A. Open-circuit voltage (V)
B. Charging time (hours)
C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



A. Open-circuit voltage (V)
B. Charging condition of the battery (%)
C. Ambient temperature 20 °C (68 °F)

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5. Charge:
   - Battery
     (refer to the appropriate charging method)

EWA13300

⚠ WARNING

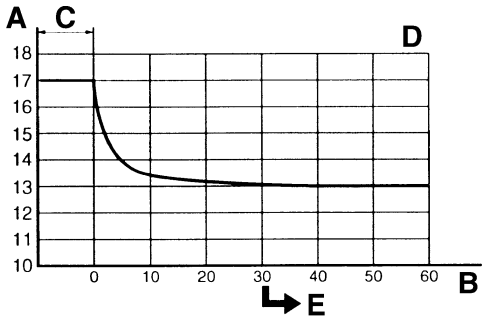
Do not quick charge a battery.

ECA13671

NOTICE

- **Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead**

from the battery terminal.)
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**
- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**
- **As shown in the following illustration, the open-circuit voltage of a VRLA (Valve Regulated Lead Acid) battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**



A. Open-circuit voltage (V)
B. Time (minutes)
C. Charging
D. Ambient temperature 20 °C (68 °F)
E. Check the open-circuit voltage.

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Charging method using a variable-current (voltage) charger

a. Measure the open-circuit voltage prior to charging.

TIP
Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

TIP
Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

c. Make sure that the current is higher than the standard charging current written on the battery.

TIP
If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached
  Battery is good.
- Standard charging current is not reached
  Replace the battery.

d. Adjust the voltage so that the current is at the standard charging level.
e. Set the time according to the charging time suitable for the open-circuit voltage.
f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

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Charging method using a constant voltage charger

a. Measure the open-circuit voltage prior to charging.

TIP
Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.
c. Make sure that the current is higher than the standard charging current written on the battery.

TIP
If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the VRLA (Valve Regu-

lated Lead Acid) battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

TIP
Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete. 12.7 V or less --- Recharging is required. Under 12.0 V --- Replace the battery.

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6. Install:
   • Battery
   Refer to "GENERAL CHASSIS" on page 4-1.
7. Check:
   • Battery terminals
   Dirt → Clean with a wire brush.
   Loose connection → Connect properly.
8. Lubricate:
   • Battery terminals

	Recommended lubricant **Dielectric grease**

9. Connect:
   • Battery coupler
   (to the battery terminals)
10. Install:
    • Seat assembly
    Refer to "GENERAL CHASSIS" on page 4-1.

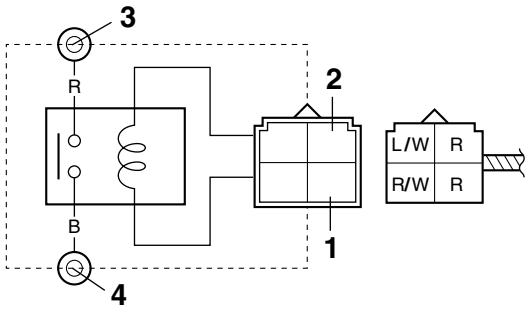
EAS28040
CHECKING THE RELAY

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminal as shown.
   Check the relay operation.
   Out of specification → Replace.

Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

	Result **Continuity** **(between "3" to "4")**

EAS28060
CHECKING THE SPARK PLUG CAP

1. Check:
   • Spark plug cap resistance
   Out of specification → Replace.

	Resistance **10.0 kΩ at 20 °C (68 °F)**

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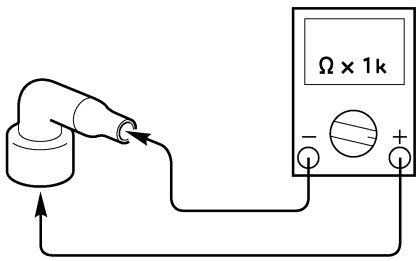
a. Remove the spark plug cap from the spark plug lead.
b. Connect the pocket tester (Ω × 1k) to the spark plug cap as shown.

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**



c. Measure the spark plug cap resistance.

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EAS28090
CHECKING THE IGNITION COIL
1. Check:
   • Primary coil resistance
   Out of specification → Replace.

Primary coil resistance
0.32–0.48 Ω at 20 °C (68 °F)

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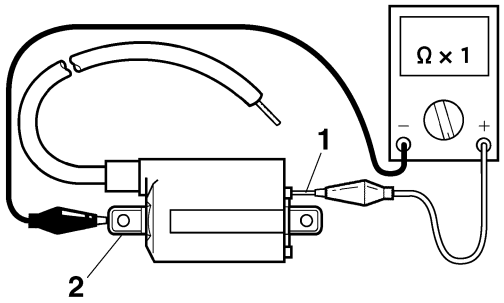
a. Disconnect the ignition coil connector from the ignition coil terminal.
b. Connect the pocket tester (Ω × 1) to the ignition coil as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
orange "1"
• Negative tester probe
Ignition coil base "2"



c. Measure the primary coil resistance.

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2. Check:
   • Secondary coil resistance
   Out of specification → Replace.

Secondary coil resistance
5.68–8.52 kΩ at 20 °C (68 °F)

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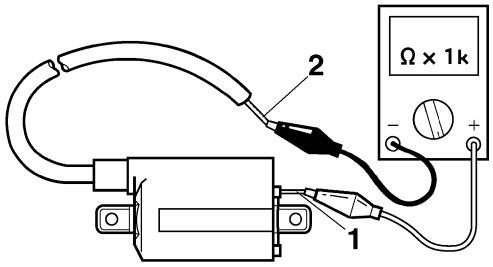
a. Disconnect the spark plug cap from the ignition coil.
b. Connect the pocket tester (Ω × 1k) to the ignition coil as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
orange "1"
• Negative tester probe
Spark plug lead "2"



c. Measure the secondary coil resistance.

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3. Check:
   • Ignition spark gap
   Out of specification → Replace.

Minimum ignition spark gap
6.0 mm (0.24 in)

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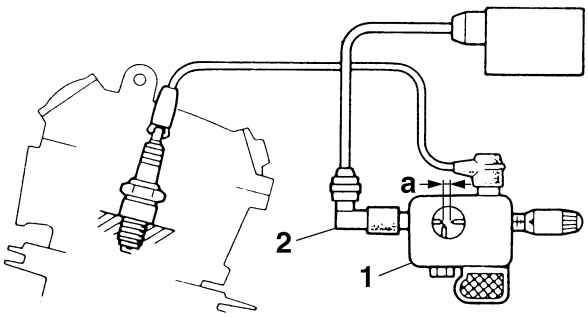
a. Disconnect the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Oppama pet-4000 spark checker
YM-34487



2. Spark plug cap

c. Set the main switch to "ON".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the start switch and gradually increase the spark gap until a misfire occurs.

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EAS1P6U806
CHECKING THE STARTER MOTOR OPERATION

1. Check:
   • Starter motor operation
   Does not operate → Perform the electric starting system troubleshooting, starting with step 5.
   Refer to "TROUBLESHOOTING" on page 7-7.

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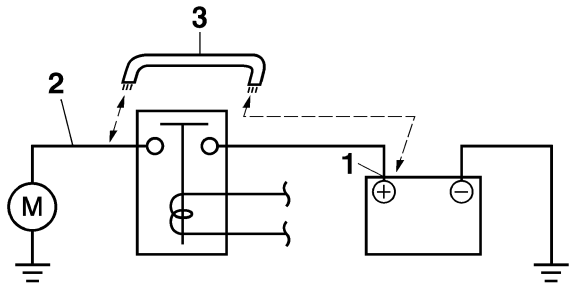
a. Connect the positive battery terminal "1" and starter motor lead "2" with a jumper lead "3".

EWA13810
⚠ WARNING

- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**



b. Check the starter motor operation.

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EAS28110
CHECKING THE PICKUP COIL

1. Disconnect:
   • Pickup coil coupler
   (from the wire harness)
2. Check:
   • Pickup coil resistance
   Out of specification → Replace the pickup coil/stator assembly.

Pickup coil resistance
248–372 Ω at 20 °C (68 °F)

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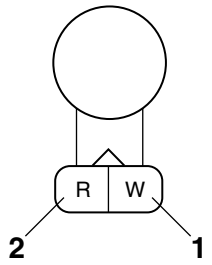
a. Connect the pocket tester (Ω × 100) to the pickup coil terminal as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
white "1"
• Negative tester probe
red "2"



b. Measure the pickup coil resistance.

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EAS28140
CHECKING THE LIGHTING COIL

1. Disconnect:
   • Stator coil coupler
   (from the wire harness)
2. Check:
   • Lighting coil resistance
   Out of specification → Replace the pickup coil/stator assembly.

Lighting coil resistance
0.80–1.20 Ω (B-Y)
at 20 °C (68 °F)

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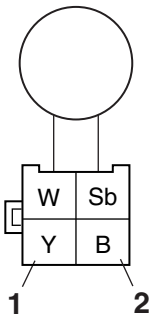
a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
yellow "1"
• Negative tester probe
black "2"



b. Measure the lighting coil resistance.

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EAS28150

CHECKING THE CHARGING COIL

1. Disconnect:
   • Stator coil coupler
   (from the wire harness)
2. Check:
   • Charging coil resistance
   Out of specification → Replace the pickup coil/stator assembly.

Charging coil resistance
0.96–1.44 Ω (B-W)
at 20 °C (68 °F)

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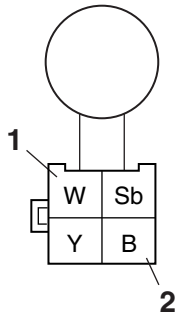
a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
white “1”
• Negative tester probe
black “2”



b. Measure the charging coil resistance.

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EAS28170

CHECKING THE RECTIFIER/REGULATOR

1. Check:
   • Charging voltage
   Out of specification → Replace the rectifier/regulator.

Charging voltage
14 V at 5000 r/min

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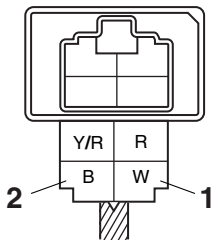
a. Set the engine tachometer to the ignition coil.
b. Connect the pocket tester (DC 20 V) to the rectifier/regulator coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
white “1”
• Negative tester probe
black “2”



c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the charging voltage.

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EAS28270

CHECKING THE THERMO SWITCH

1. Remove:
   • Thermo switch

EWA13830

⚠ WARNING

• Handle the thermo switch with special care.
• Never subject the thermo switch to strong shocks. If the thermo switch is dropped, replace it.

2. Check:
   • Thermo switch continuity
   Out of specification → Replace the thermo switch.

Test step	Water temperature	Continuity
1	Less than 16 ± 3 °C (60.8 ± 5.4 °F)	YES
2	More than 16 ± 3 °C (60.8 ± 5.4 °F)	NO
3	More than 11 ± 3 °C (51.8 ± 5.4 °F)	NO
4	Less than 11 ± 3 °C (51.8 ± 5.4 °F)	YES

Steps 1 and 2: Heating phase
Steps 3 and 4: Cooling phase

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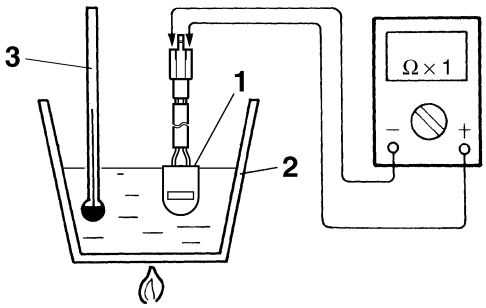
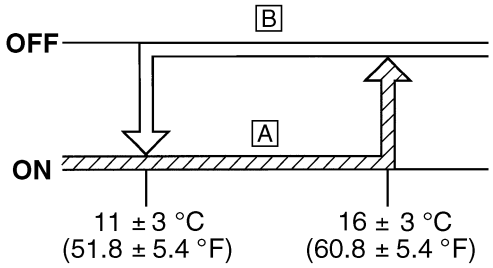
a. Connect the pocket tester (Ω × 1) to the thermo switch "1" as shown.
b. Immerse the thermo switch in a container filled with water "2".
c. Place a thermometer "3" in the water.





A. Heating phase
B. Cooling phase

d. Slowly heat the water, then let it cool down to the specified temperature.
e. Check the thermo switch for continuity.

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EAS28310

CHECKING THE CARBURETOR WARMER

1. Check:
   • Carburetor warmer resistance

Out of specification → Replace.

Resistance
4.8–14.4 Ω at 20 °C (68 °F)

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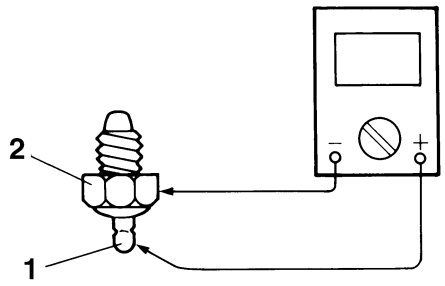
a. Remove the carburetor warmer lead from the carburetor.
b. Connect the pocket tester (Ω × 1) to the carburetor heating element as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

• Positive tester probe
  Carburetor heating element terminal "1"
• Negative tester probe
  Carburetor warmer body "2"



c. Measure the carburetor warmer resistance.

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TROUBLESHOOTING

EAS28451
TROUBLESHOOTING

EAS28460
GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470
STARTING FAILURES

Engine

1. Cylinder and cylinder head
   - Loose spark plug
   - Loose cylinder head or cylinder
   - Damaged cylinder head gasket
   - Damaged cylinder gasket
   - Worn or damaged cylinder
   - Incorrect valve clearance
   - Improperly sealed valve
   - Incorrect valve-to-valve-seat contact
   - Incorrect valve timing
   - Faulty valve spring
   - Seized valve
2. Piston and piston ring
   - Improperly installed piston ring
   - Damaged, worn or fatigued piston ring
   - Seized piston ring
   - Seized or damaged piston
3. Air filter
   - Improperly installed air filter
   - Clogged air filter element
4. Crankcase and crankshaft
   - Improperly assembled crankcase
   - Seized crankshaft

Fuel system

1. Fuel tank
   - Empty fuel tank
   - Clogged fuel filter
   - Clogged fuel strainer
   - Deteriorated or contaminated fuel
2. Fuel cock
   - Clogged or damaged fuel hose
3. Carburetor
   - Deteriorated or contaminated fuel
   - Clogged pilot jet
   - Clogged pilot air passage
   - Sucked-in air
   - Damaged float
   - Worn needle valve
   - Improperly installed needle valve seat
   - Incorrect fuel level
   - Improperly installed pilot jet
   - Clogged starter jet
   - Faulty starter plunger

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse(s)
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
4. Ignition coil
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
5. Ignition system
   - Faulty CDI unit
   - Faulty pickup coil
   - Broken AC magneto rotor woodruff key
6. Switches and wiring
   - Faulty main switch
   - Faulty engine stop switch
   - Broken or shorted wiring
   - Faulty neutral switch
   - Faulty start switch
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty starter clutch

EAS28490
INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder and cylinder head
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system

1. Carburetor
   - Faulty starter plunger
   - Loose or clogged pilot jet
   - Loose or clogged pilot air jet
   - Damaged or loose carburetor joint

- Improperly adjusted engine idling speed (throttle stop screw)
- Improper throttle grip free play
- Flooded carburetor

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Spark plug
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
3. Ignition coil
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
   - Cracked or broken ignition coil
4. Ignition system
   - Faulty CDI unit
   - Faulty pickup coil
   - Broken AC magneto rotor woodruff key

EAS28520

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 8-1.

Engine

1. Air filter
   - Clogged air filter element
2. Air intake system
   - Bent, clogged or disconnected carburetor air vent hose
   - Clogged or leaking air duct

Fuel system

1. Carburetor
   - Incorrect fuel level
   - Loose or clogged main jet

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS28540

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS28560

FAULTY CLUTCH

Clutch slips

1. Clutch
   - Improperly assembled clutch
   - Loose or fatigued clutch spring
   - Worn friction plate
   - Worn clutch plate
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (low)
   - Deteriorated oil

Clutch drags

1. Clutch
   - Unevenly tensioned clutch springs
   - Warped pressure plate
   - Bent clutch plate
   - Swollen friction plate
   - Broken clutch boss
   - Burnt primary driven gear bushing
   - Match marks not aligned
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (high)
   - Deteriorated oil

EAS28590

OVERHEATING

Engine

1. Cylinder head and piston
   - Heavy carbon buildup
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity
   - Inferior oil quality

Fuel system
1. Carburetor
   • Incorrect main jet setting
   • Incorrect fuel level
   • Damaged or loose carburetor joint
2. Air filter
   • Clogged air filter element

Chassis
1. Brake
   • Dragging brake

Electrical system
1. Spark plug
   • Incorrect spark plug gap
   • Incorrect spark plug heat range
2. Ignition system
   • Faulty CDI unit

EAS28630
POOR BRAKING PERFORMANCE
• Worn brake shoe
• Worn or rusty brake drum
• Incorrect brake pedal position
• Incorrect brake pedal free play
• Incorrect brake camshaft lever position
• Incorrect brake shoe position
• Damaged or fatigued brake shoe spring
• Oil or grease on the brake shoe
• Oil or grease on the brake drum
• Broken brake torque rod

EAS28660
FAULTY FRONT FORK LEGS
Malfunction
• Bent or damaged inner tube
• Bent or damaged outer tube
• Damaged fork spring
• Worn or damaged outer tube bushing
• Bent or damaged damper rod

EAS28690
UNSTABLE HANDLING
1. Handlebar
   • Bent or improperly installed handlebar
2. Steering head components
   • Improperly installed upper bracket
   • Improperly installed lower bracket (improperly tightened ring nut)
   • Bent steering stem
   • Damaged ball bearing or bearing race
3. Front fork leg(s)
   • Unevenly tensioned fork spring (both front fork legs)
   • Broken fork spring
   • Bent or damaged inner tube
   • Bent or damaged outer tube
4. Swingarm
   • Worn bearing or bushing
   • Bent or damaged swingarm
5. Rear shock absorber assembly
   • Faulty rear shock absorber spring
   • Leaking oil
6. Tire(s)
   • Uneven tire pressures (front and rear)
   • Incorrect tire pressure
   • Uneven tire wear
7. Wheel(s)
   • Incorrect wheel balance
   • Broken or loose spoke
   • Damaged wheel bearing
   • Bent or loose wheel axle
   • Excessive wheel runout
8. Frame
   • Bent frame
   • Damaged steering head pipe
   • Improperly installed bearing race

EAS28740

WIRING DIAGRAM

TT-R50E(B) 2012

1. Rectifier/regulator
2. Battery
3. Fuse
4. Main switch
5. Engine stop switch
6. Thermo switch
7. Carburetor warmer
8. AC magneto
9. Neutral switch
10. CDI unit
11. Ignition coil
12. Spark plug
13. Start switch
14. Starter motor
15. Starter relay
16. Ground lead

EAS28750

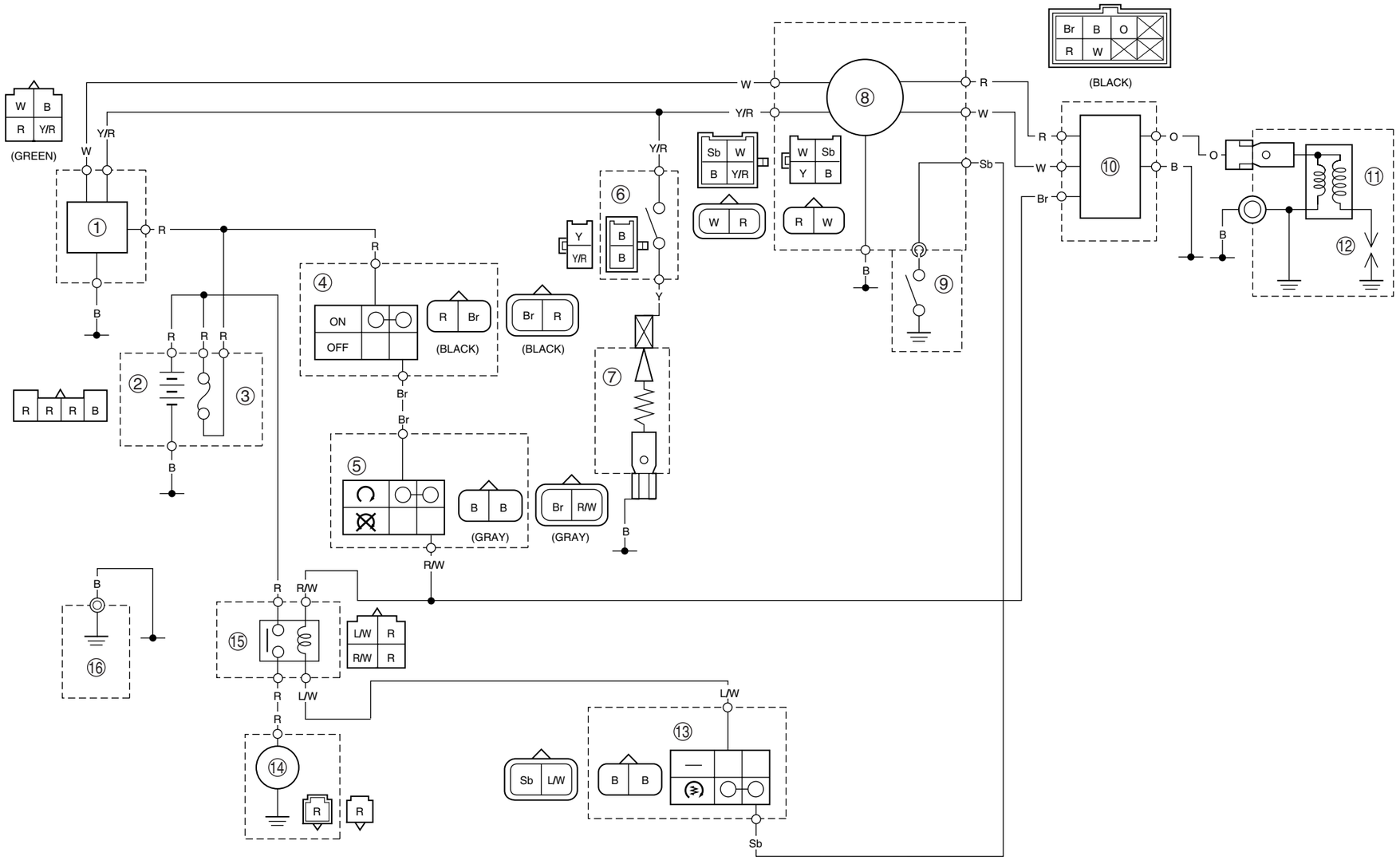
COLOR CODE

B	Black
Br	Brown
O	Orange
R	Red
Sb	Sky blue
W	White
Y	Yellow
L/W	Blue/White
R/W	Red/White
Y/R	Yellow/Red

TT-R50E(B) 2012
WIRING DIAGRAM

TT-R50E(B) 2012
SCHÉMA DE CÂBLAGE

TT-R50E(B) 2012
SCHALTPLAN



TT-R50E(B) 2012
WIRING DIAGRAM

TT-R50E(B) 2012
SCHÉMA DE CÂBLAGE

TT-R50E(B) 2012
SCHALTPLAN